D-33

SERVICE MANUAL

US Model
Canadian Model
AEP Model
E Model
Australian Model

MEGA BASS
Discman

Model Name Using Similar Mechanism	D-11
CD Mechanism Name	KSM-220ABN

SPECIFICATIONS

CD section

System: Compact disc digital audio system
Laser diode properties: Material: GaAlAs
Wavelength: λ = 780 nm
Emission duration: Continuous Laser output: Less than 44.6μW (This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block.)
Error correction: Sony Super Strategy Cross Interleave Read Solomon Code D-A conversion 16-bit linear 8fs digital filter
Frequency response: 20–20,000 Hz $\pm^{\frac{1}{2}}_{3}$ dB
(measured by EIAJ CP-307)
Output (at 9V input level): Line output (stereo minijack)
Output level 1 V rms at 47 kilohms
Load impedance over 10 kilohms
Headphones (stereo minijack)
5mW + 5mW at 16Ω

General

Power requirements: Supplied:
• DC IN 9 V jack accepts the Sony AC power adaptor for use one:
120V AC, 60Hz (US, Canadian Model)
220V AC, 50Hz (AEP Model)
100-240V, 50/60Hz (E, Australian Model)
Optional:
• DC IN 9V accepts the Sony CPM-203P mount plate and CPM-200A plate arm for use on 12V car battery.
• DC 6V, four LR6 (size AA) alkaline-batteries
Power consumption: 1.2W DC
Dimensions: Approx. 137 × 35 × 155.3 mm (5½ × 1⁷⁄₁₆ × 6⅛) (w/h/d) incl. projecting parts and controls
Weight: Approx. 410 g (14.5 oz.) net
Approx. 505 g (18 oz.) incl. batteries
Supplied accessories: AC power adaptor (1)
Connecting cord
(phono plug × 2↔stereo miniplug × 1) (1)
Stereo headphones (1)

Design and specifications subject to change without notice.

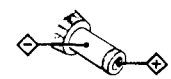
CAUTION
The use of optical instruments with this product will increase eye hazard.

For the AEP MODEL

CLASS 1 LASER PRODUCT
LUOKAN 1 LASERLAITE
KLASS 1 LASERAPPARAT

This Compact Disc player is classified as a CLASS 1 LASER product.
The CLASS 1 LASER PRODUCT label is located on the bottom exterior.

Note on the AC power adaptor
Use only the AC power adaptor supplied or AC-E6M/AC-E90M AC power adaptor (not supplied). Do not use any other AC power adaptor.
The AC power adaptor supplied with other DISCMAN models with DC IN 9V or DC IN 6V jack and AC-D6M, etc. cannot be used with this unit.


Polarity of the plug
(Unified polarity type)

MICROFILM

COMPACT DISC COMPACT PLAYER

SONY®

CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

ADVARSEL !
Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Lever det brugte batteri tilbage til leverandœren.

ADVARSEL

Lithiumbatteri – Eksplosjonsfare.
Ved utskifting benyttes kun batteri som
anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandœren.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent
typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens
instruktion.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

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SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

SECTION 1
SERVICING NOTES

NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic breakdown because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.
During repair, pay attention to electrostatic breakdown and also use the procedure in the printed matter which is included in the repair parts.
The flexible board is easily damaged and should be handled with care.

Flexible Circuit Board Repairing

- Keep the temperature of the soldering iron around 270℃ during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

CAUTION

1. To prevent damages to the S801 (OPEN SW)
   If the P plate is installed when the CD cover is closed, the S801 lever is positioned behind the open/close arm section of the cover. Thus, when the cover is opened, the S801 will be damaged.

- To prevent damages to the S801 (OPEN SW), do not install the P plate when the CD cover is closed. Install the P plate when the CD cover is opened. In addition, check the position of the S801 lever when installing the P plate.

2. Special mode for normal operation check
   The S801 (OPEN SW) of the D-33 is found near the contact joint of the cover. Since it is difficult to turn the power ON without the cover with the test tool, conduct the following step to enable normal operation without the cover.

- Press the PLAY and STOP button simultaneously while turning the DC power supply ON.

Before Replacing the Optical Block

Please be sure to check thoroughly the parameters as for the "Optical Block Checking Procedures" (Part No. : 9-960-027-11) issued separately before replacing the optical block. Note and specifications required to check are given below.

- FOK output : IC501 ⑨ pin
  When checking FOK, remove the lead wire to disc motor and unsolder and open IC801 ㉒ pin (FOK).
- S carve P-to-P value : 3Vp-p
  When checking S carve P-to-P value, remove the lead wire to disc motor.
- Adjusted part for focus gain adjustment : RV501
- RF signal P-to-P value : 0.7 – 1.25Vp-p
- Traverse signal P-to-P value : 1.5Vp-p
- The repairing grating holder is impossible.
- Adjusted part for tracking gain adjustment : RV502

NOTES ON LASER DIODE EMISSION CHECK

The laser beam on this model is concentrated so as to be focused on the disc reflective surface by the objective lens in the optical pick-up block. Therefore, when checking the laser diode emission, observe more than 25cm away from the objective lens.

Laser Diode Check Procedure

The laser diode on this set will not emit unless the top panel is closed and S801 (leaf SW type) is turned on. The laser diode will always emit even if focus search is not performed in service mode.

The laser diode is checked using the current value which flows to the laser diode inside the optical pick-up block.

Procedure 1 (service mode or normal operation)

Check the laser diode emission with the eye.

1. Open upper panel.
2. S801 on as Fig. 1.
   (In service mode, this operation is not necessary.)
3. Press the ▶|| key.
   (In service mode, this operation is not necessary.)
4. Observe the objective lens and confirm that the laser diode is emitting light. At this time, the laser diode goes on about 10 seconds due to focus serarch. If it does not, APC circuit or optical pick-up block is defective.

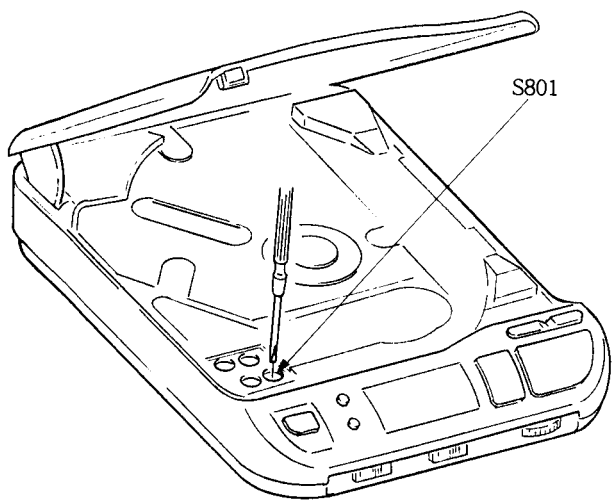
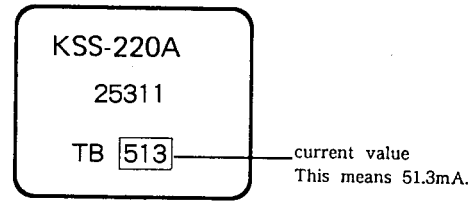


Fig.1 Turning S801 on

Procedure 2 (service mode or normal operation)

Check by the current with flows in the laser diode.

1. Close the top panel.
2. Remove the main board and read the current value on the label affixed to the optical pick-up block.
   (Label on optical pick-up block)



   The current value varies with the set.
3. Connect a VOM as shown in Fig. 2.
4. Press the ▶|| key.
5. Calculate the current by the VOM reading.
   VOM reading (V) ÷10=current (A)
   ex. VOM reading=0.56V
   0.56÷10=0.056 (A) =56 (mA)
6. Confirm that the ammeter reading is within the range given below.
   value on label $^{+5}_{-11}$ mA (25℃)
   variation relative to temperature : 0.4mA/℃
   (Current increases when temperature rises and decreases when it drops.)

If the value is more than the range give, APC circuit has been defective or the laser diode has deteriorated. If it is less, APC circuit or optical pick-up block is defective.

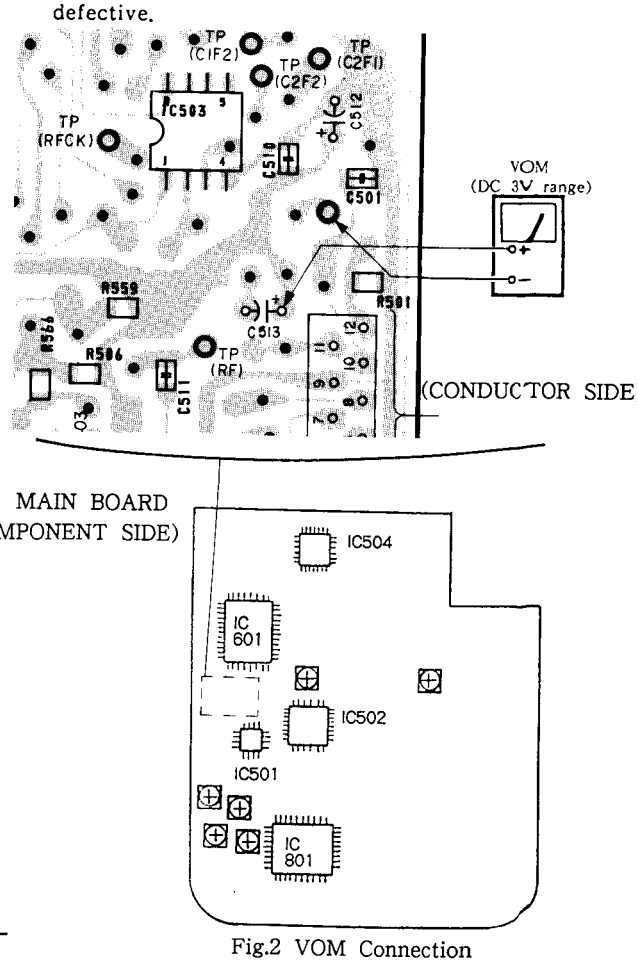


Fig.2 VOM Connection

SERVICE MODE (service program)

This set has built-in service program in the microcomputer as usual sets.

The operation method of service program is explained below.

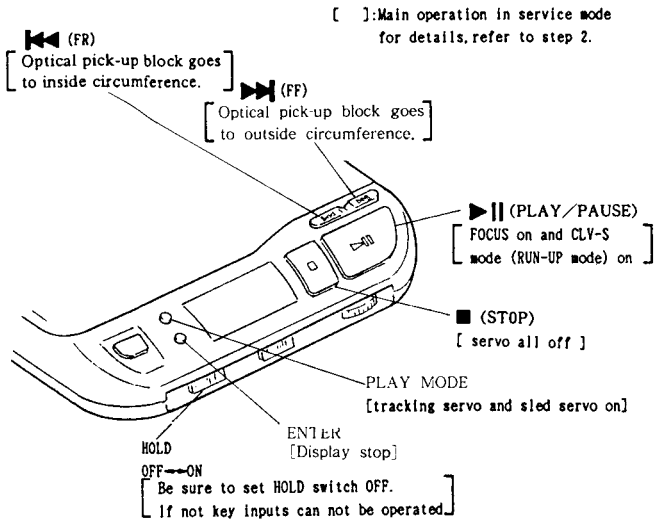

[ ]:Main operation in service mode
for details, refer to step 2.
⏮ (FR)
Optical pick-up block goes to inside circumference.
⏭ (FF)
Optical pick-up block goes to outside circumference.
▶II (PLAY/PAUSE)
FOCUS on and CLV-S mode (RUN-UP mode) on
■ (STOP)
[servo all off]
PLAY MODE
[tracking servo and sled servo on]
ENTER
[Display stop]
HOLD
OFF⟷ON
Be sure to set HOLD switch OFF.
If not key inputs can not be operated.

Fig.3 Key Positions

• Step 1 (Service Mode setting method)

1. Turn the HOLD switch OFF with the external power supply not plugged in (no power applied to set) and press the ▶II key.
2. Solder jumper TEST terminal.
   (IC801 pin㉔(TEST) is grounded.)
3. Plug in external power supply.
   This puts the set into service mode.

• Step 2 (Service Mode operation)

1. When service mode is set, the display will change 6 times, and those 6 changes will be repeated over and over.
   With this the LCD display should be present in service mode. Even if LCD does not display, other operations will be performed.
2. When ⏭ or ⏮ key is pressed, the optical pick-up block moves to the inside or outside circumference. Tracking servo and sled servo go off when this is done, so press PLAY-MODE to turn on the tracking servo if necessary.
3. When ▶II key is pressed, CLV-S (pull-in mode) starts while performing focus search. When there is no disc installed, focus search is repeated several times while disc motor is rotating.
4. When PLAY-MODE is pressed, tracking servo, sled servo and CLV-A (servo during PLAY) go ON.
5. When 3 and 4 are performed, the disc begins to play. At this time, the top panel should be closed and S801 is to be ON. A sound is not produced as muting is ON.
6. All servo (focus, tracking, sled and spindle) go off when ■ key is pressed.

• Step 3 (Service Mode release)

1. First be sure to unplug the external power supply, then remove the solder jumper TEST terminal.
2. The set will now operated normally.

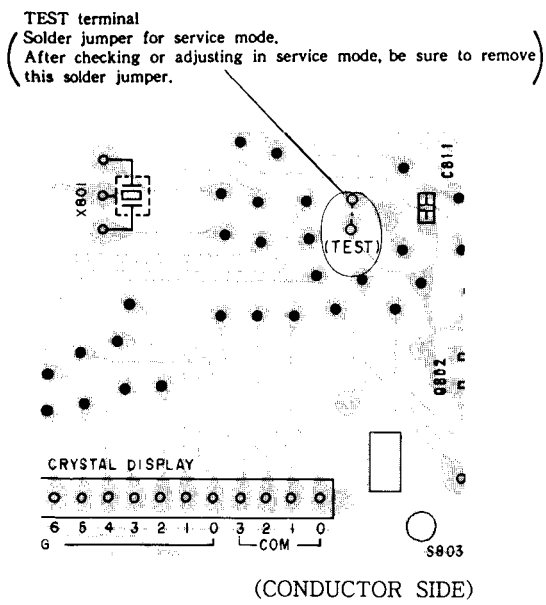
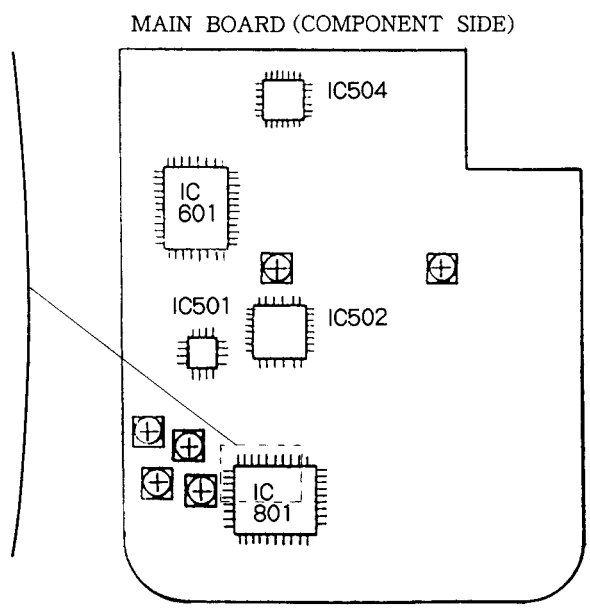


Fig.4 TEST terminal position



PACK ASSY INSTALLING PROCEDURE

The positioning adjustment is required when installing the rack assy.

Perform the adjustment using with rack assy positioning jig.

Description	Part No.
Rack Assy Positioning Jig	4-931-565-01

[Adjustment Procedure]

(1) Position the rack assy so that the distance A and B becomes equal by rotating the sled gear. (A=B=6 mm)
Loosen the rack assy mounting screws.

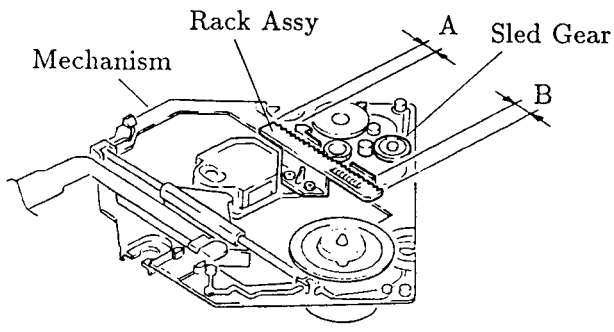


Fig-1

(2) Place the positioning jig on the mechanism as shown in figure 2.
The shaft comes in the "U" gutter of jig.

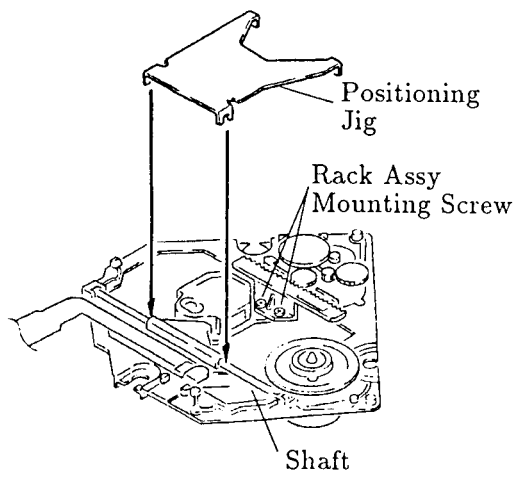


Fig-2

(3) While pressing the rack assy to the direction of arrow in order to keep the contact the teeth of rack gear with the jig, tighten the screws.

Note : Tighten the each screw alternately and little by little.

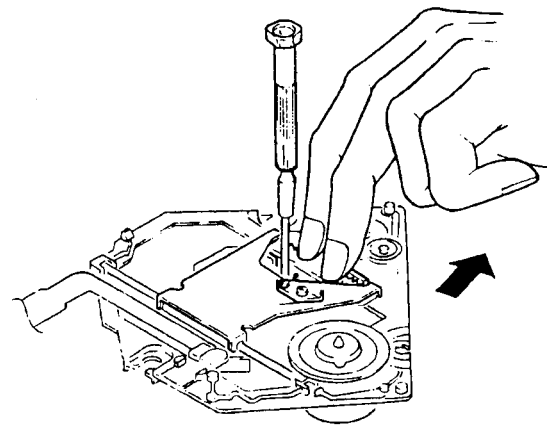


Fig-3

(4) Confirm the clearance between the teeth of rack gear and the jig as shown in figre 4.
Remove the rack assy side of jig first when removing the jig.
(Be sure not to remove it from the shaft side first.)

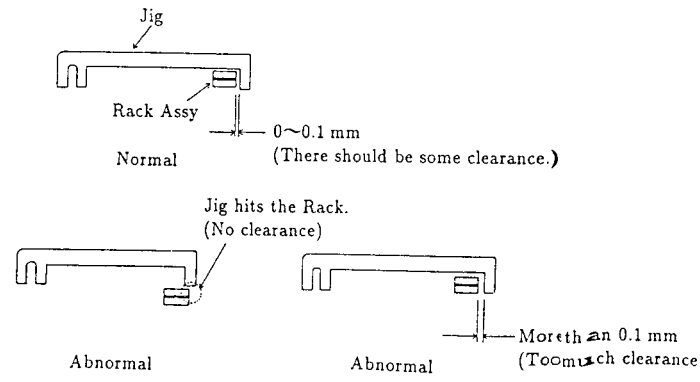


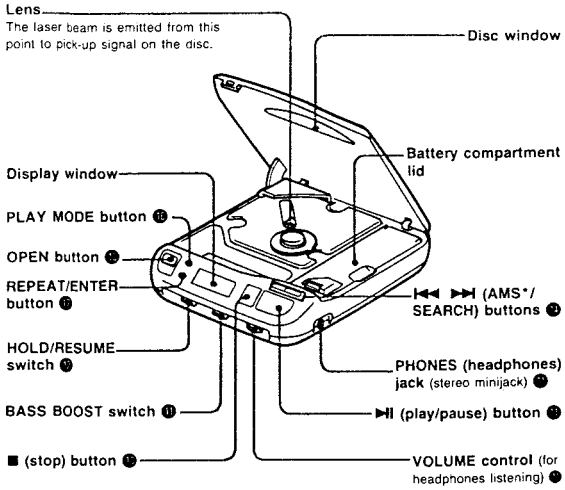
Fig-4

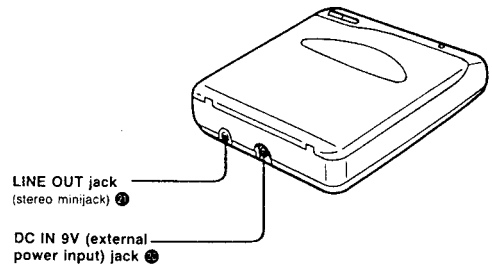
SECTION 2
GENERAL

This section is extracted from instruction manual.

Location and Function of Controls

See the pages indicated in ● for more details.





*AMS is an abbreviation for Automatic Music Sensor.

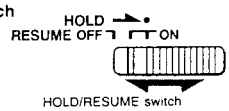
Disc Playing

To resume the disc play from the point where you last stopped the play (Resume play mode)

You can resume the disc play from the point where you last pressed ■. To enter this mode, set the HOLD/RESUME switch to the center or the right position. The resume function can be performed in any operation mode. (Refer to the table shown below.)

The positions of the HOLD/RESUME switch

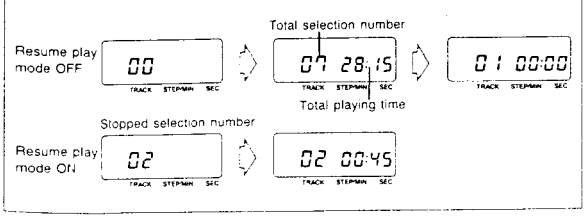
	1st. (left)		2nd. (center)		3rd. (right)
Hold	OFF	—	OFF	—	ON
Resume play mode	OFF	—	ON	—	ON



You can hold the disc play locking the buttons to prevent them from being accidentally depressed. To enter this mode, set the HOLD/RESUME switch to the right position.

Note on the display window while the disc is playing

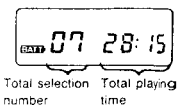
When the disc play start
The display window changes as follows.



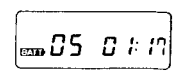
Notes
- We recommend you to install the batteries for the resume play. The memory of the stopped point will be maintained by the batteries even if you remove the car battery cord or AC power adaptor, or set the ignition key to the off position.
- The memory of the stopped point is canceled if you open the lid after pressing ■. After the memory is canceled, play starts from the first selection of the disc.

On Display Window

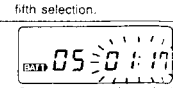
On time counter
When you press ⏯
Total selection number of the disc and then the total playing time appear.



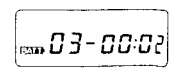
During the play
The truck number and the elapsed playing time of the current selection appear.


1 min. 17 sec. has elapsed from the beginning of the fifth selection.

During the pause
The elapsed playing time of the current point flashes.


Pause mode at the point 1 min. 17 sec. from the beginning of the fifth selection

Between the selections
The time to the beginning of the next selection appears.


2 sec. to the beginning of the 3rd selection

Locating a Particular Portion

	To locate the beginning of the current selection	To locate the beginning of the next selection
Locating a particular selection (AMS*)	Press once.	Press once.
Locating a particular point in a selection (SEARCH)	To go back at high speed. Keep pressing.	To go ahead at high speed. Keep pressing.

* AMS is the abbreviation of Automatic Music Sensor.

Notes on the AMS function

- The player pauses at the beginning of the located selection when you press ⏮ or ⏭ in the pause mode.
- Each time you press ⏮, the player locates the previous selection. Each time you press ⏭, the player locates the next selections and stops at the last selection.
- During the programmed play, AMS operates in the programmed order.

Note on the SEARCH function

While searching, the elapsed playing time appears in the display window.

What is this indication?

_I_I appears if you continuously press ⏭ at the end of the disc. To return to the selection number indication, press ⏮.

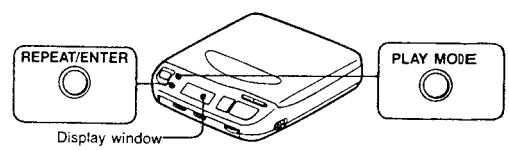
Various Playing Modes

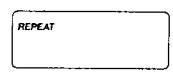
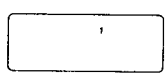
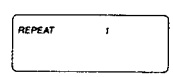
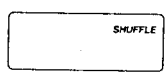
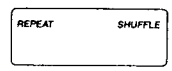
This unit has 10 playing modes.

To change the mode, press the PLAY MODE button during play. The current mode appears in the display window.

To play repeatedly, press REPEAT/ENTER button.
"REPEAT" appears in the display window.
Press again to cancel the repeat play.

To stop the disc, press ■ button.



	REPEAT/ENTER button is not pressed.		REPEAT/ENTER button is pressed.	
	Display window	Playing mode	Display window	Playing mode
		Normal play Plays the whole disc once and stops.		Repeats the whole disc.
PLAY MODE		**INTRO play** Plays the first about ten seconds of all the selections. **To start playing** Press ⏯. "INTRO" stops flashing and playing starts.		Plays the first about ten seconds of all the selections again and again. Press ⏯ again to listen to the selection to the end.
PLAY MODE		**Playing a single selection** Plays one selection and stops at the end of the selection.		Plays a single selection repeatedly.
PLAY MODE		**Shuffle play** Plays the whole selection in a random order.		Plays the selections in random order repeatedly.

(To be continued)

SECTION 3
ELECTRICAL ADJUSTMENTS

Notes on Adjustment

1. Perform adjustments in service mode.
   Be sure to release service mode after completing adjustments.
   (Refer to "Service Mode (service program)" on page 5.)
2. Perform adjustments in the order given.
3. Use YEDS-18 disc (part No. : 3-702-101-01) unless otherwise indicated.
4. Power supply voltage : DC 9V
   HOLD switch : OFF

PREPARATION

Put the set into service mode (See page 5.) and perform the following checks. Repair if there are any abnormalities.

• Sled Motor Check

1. Press the OPEN button and open the top panel.
2. Press the ⏭, ⏮ keys and make sure that the optical pick-up block moves smoothly, without catching, from the inmost → outmost → inmost circumference.
   ⏭ : optical pick-up block moves outward
   ⏮ : optical pick-up block moves inward

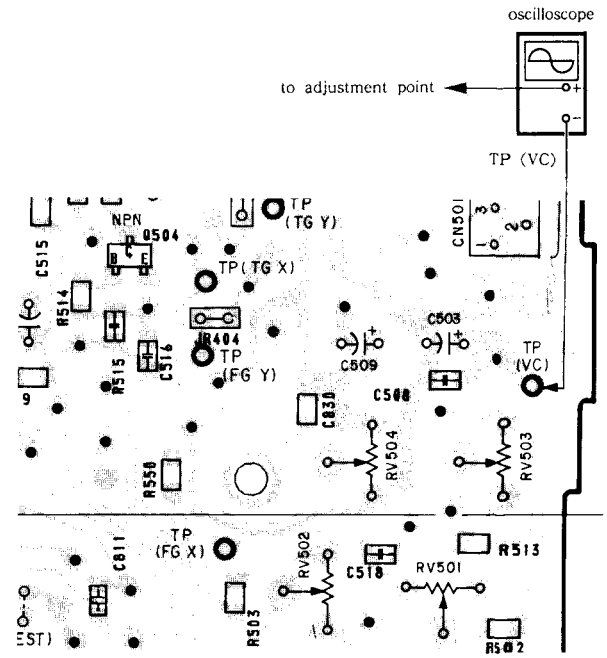
• Focus Search Check

1. Press the OPEN button and open the top panel.
2. Press the ⏯ key. (Focus search is performed continuously.)
3. Observe the optical pick-up block objective lens and check that it moves smoothly up and down with no catching or noises.
4. Press the ■ key.
   Check that focus search operation stops. If it does not, press the ■ key again.

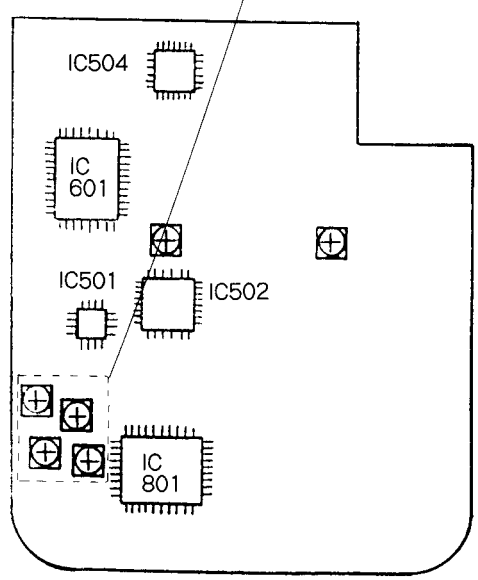
VC (1/2 Vcc) Connecting Point

FOCUS BIAS ADJUSTMENT
TRACKING BALANCE ADJUSTMENT

When the adjustments above are performed, connect the ⊖ side of oscilloscope to the point below.



(CONDUCTOR SIDE)

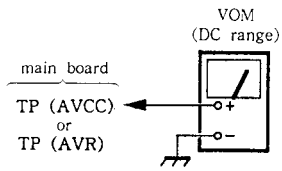


MAIN BOARD (COMPONENT SIDE)

AVCC (4.5V) Adjustment

Adjustment Procedure :

1. Put the set into service mode (see page 5).
2. Connect the VOM to main board test point TP (AVCC).
3. Adjust RV401 for 4.3V – 4.6V reading on the VOM.
4. After adjustment, release service mode (see page 5).



AVR (3.5V) Adjustment

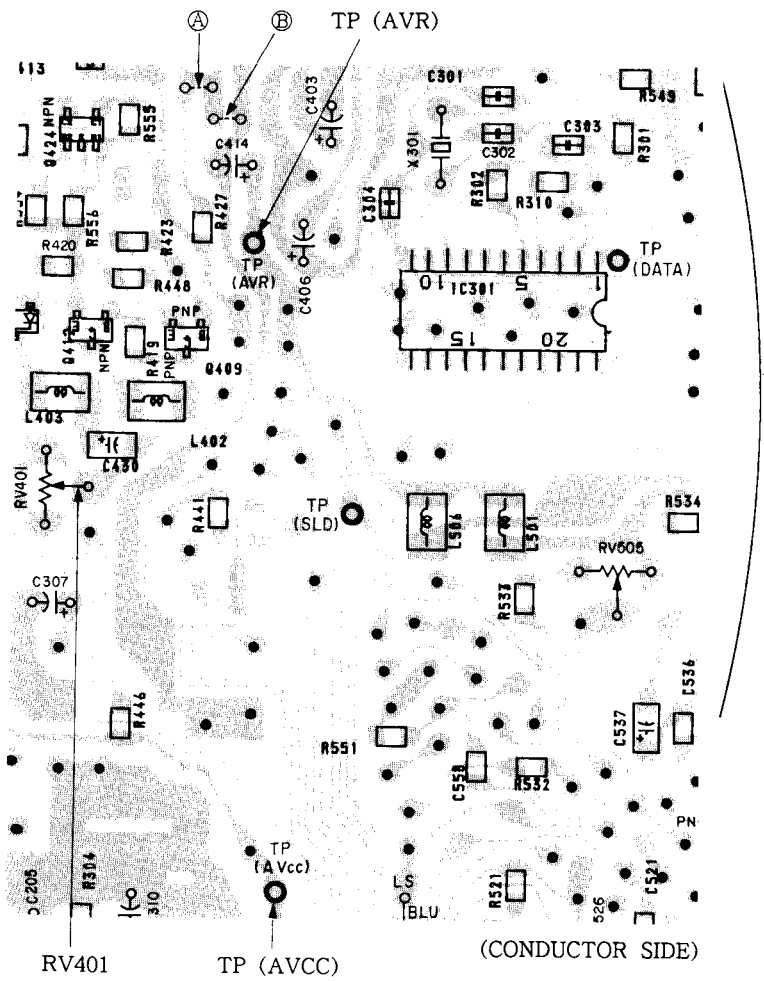
Adjustment Procedure :

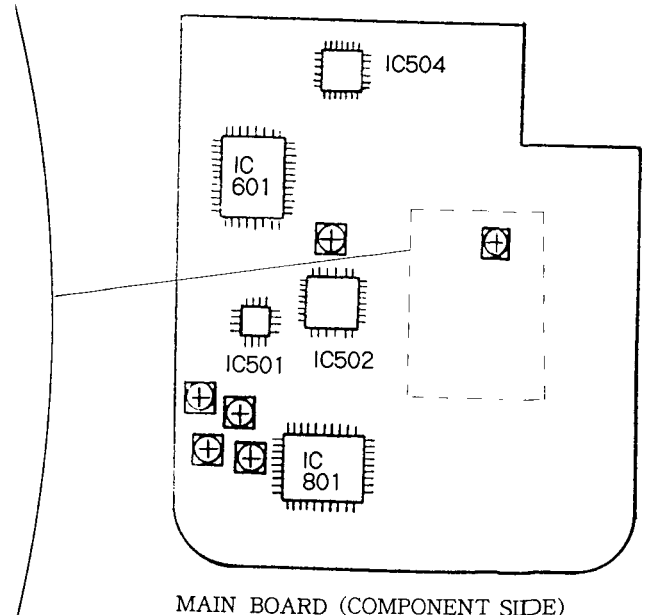
1. Put the set into service mode (see page 5).
2. Connect the VOM to main board test point TP (AVR).
3. Adjust the pattern connection (Ⓐ or Ⓑ) to obtain 3.45V to 3.6V reading on the VOM.

pattern connection		VOM reading
A	B	
○	×	down
×	×	↕
×	○	↕
○	○	up

○ : short × : open

Adjustment Location : main board

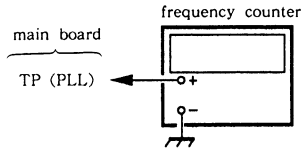




MAIN BOARD (COMPONENT SIDE)

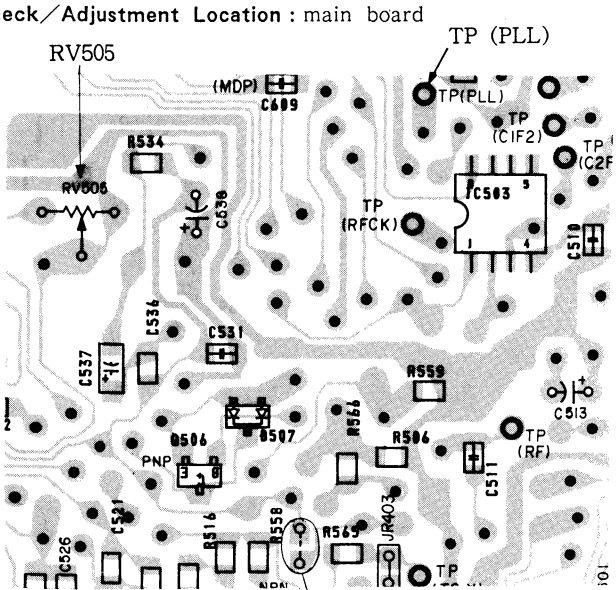
PLL Free Run Frequency Check and Adjustment

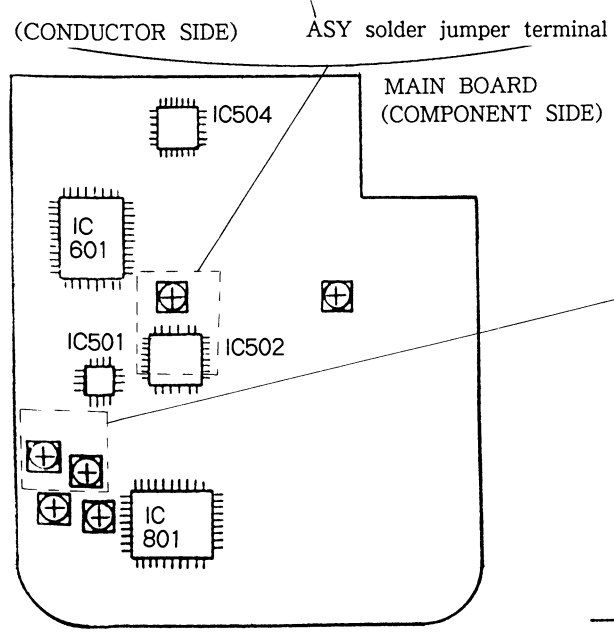
Check/Adjustment Procedure :



1. Disconnect ASY solder jumper terminal in the diagram below.
2. Connect a frequency counter to main board test point TP (PLL).
3. Put the set into service mode (See page 5).
4. Check that the frequency counter reading is 4.32±0.01 MHz. If not, adjust RV505 so that it is 4.32±0.01MHz.
5. After adjustment, release service mode (see page 5).
6. Short the jumper terminal disconnected in step 1.

Check/Adjustment Location : main board



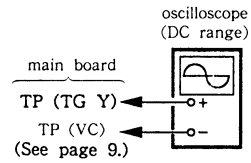


Tracking Balance Adjustment

Conditions :

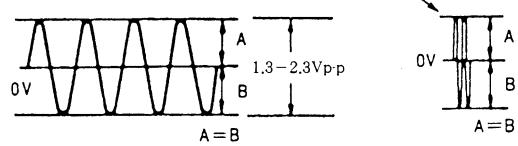
The set should be placed either horizontally.

Adjustment Procedure :



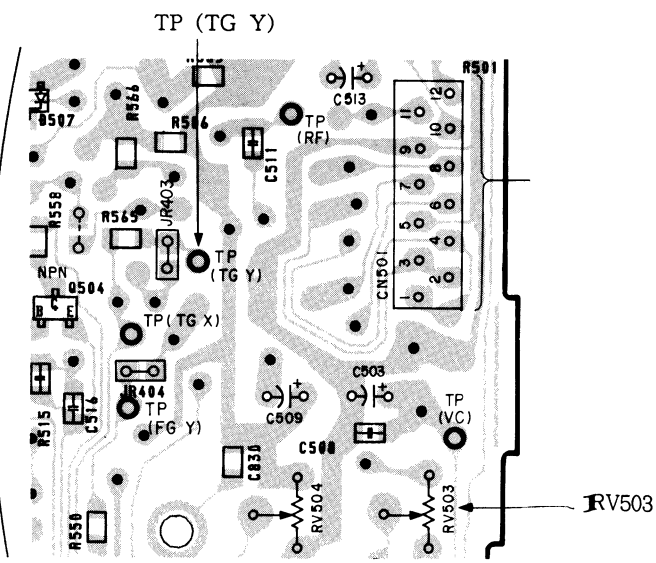
1. Connect the oscilloscope to main board TP (TG Y).
2. Put the set into service mode (See page 5.)
3. Press the ⏭ and ⏮ keys to move the opticl pick-up block to the center.
4. Insert the disc (YEDS-18) and close the top panel.
5. Press the ⏯ key.
   (It will go from focus search to focus on, and CLV pull-in mode state. Tracking and sled are OFF.)
6. Adjust RV503 so that the oscilloscope wavaform is symmetrical on the top and bottom in relation to 0V.

Note : Take sweep time as long as possible to obtain best waveform.



7. Press the ■ key.
8. After adjustment, release service mode (see page 5).

Adjustment Location : main board

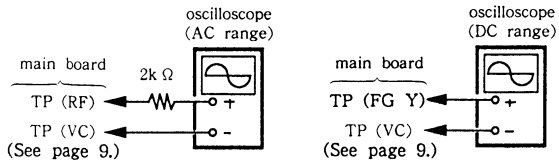


Focus Bias Adjustment

Conditions :

The set should be placed either horizontally.

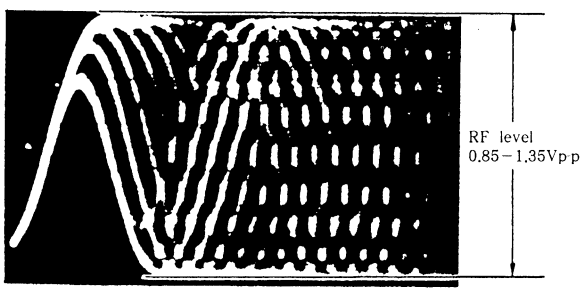
Adjustment Procedure :



1. Put the set into service mode (See page 5).
2. Connect the oscilloscope to main board test point TP (RF).
3. Press the ⏭ and ⏮ key to move the optical pick-up block to the center. (Move the optical pick-up block to the music area on the disc to enable easy visibility of the eye pattern).
4. Insert the disc (YEDS-18) and close the top panel.
5. Press the ⏯ key.
   (It will go from focus search to focus on, and CLV pull-in mode state. Tracking and sled are OFF.)
6. Press the KEY-MODE button (Tracking and sled go ON.)
7. Adjust RV504 so that the oscilloscope waveform eye pattern is good. A good eye pattern means that the diamond shape (◇) in the center of the waveform can be clearly distinguished.

• RF Signal Reference Waveform (eye pattern)

VOLT/DIV : 200mV
TIME/DIV : 500nS



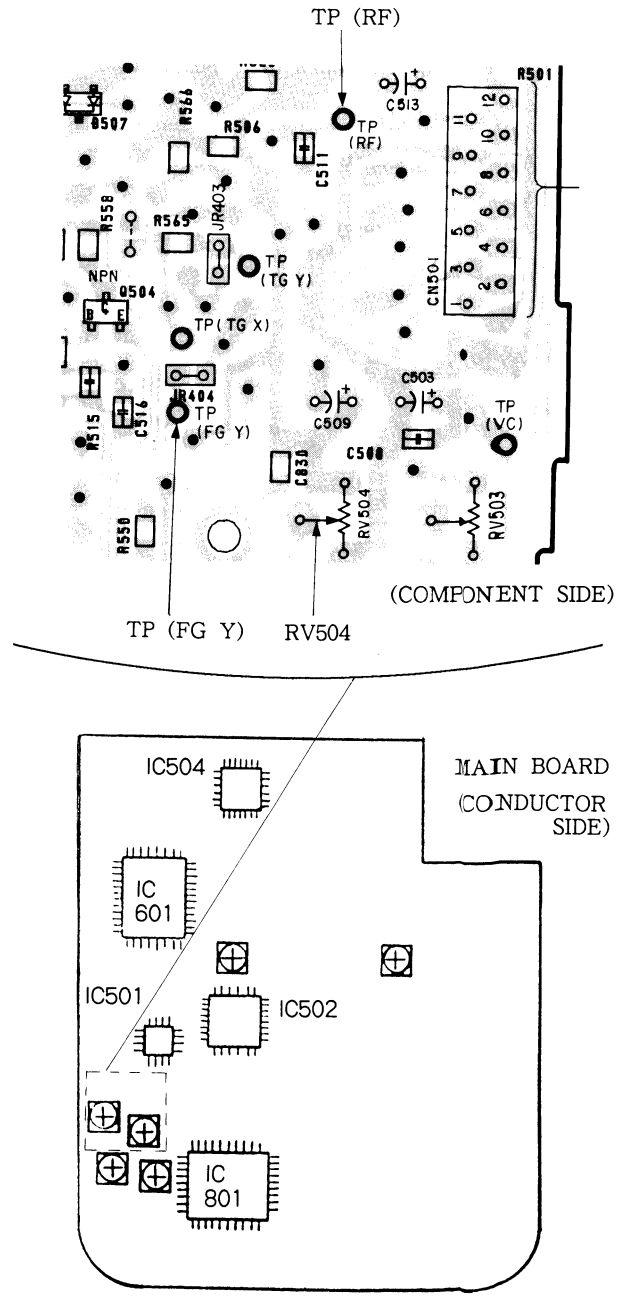
When observing the eye pattern, set the oscilloscope for AC range and raise vertical sensitivity.

8. Press the ■ key.
9. Remove the disc and connect the oscilloscope to main board TP (FG Y).
10. Adjust RV504 again refering to the table followed.

voltage of TP(FG Y)	Do not adjust again.
+80 to 200mV	Adjust RV504 again for +200mV reading on oscilloscope.
−20 to +80mV	Adjust RV504 again for −20mV reading on oscilloscope.

11. After adjustment, release service mode (see page 5).

Adjustment Location : main board



Reference

Focus/Tracking Gain Adjustment

A frequency responce analyzer or CD jig is necessary in order to perform this adjustment exactly.

However, this gain has a margin, so even if it is slightly off, there is no problem. Therefore, do not perfrom this adjustment.

Focus/tracking gain determines the pick-up followup (vertical and horizontal) relative to mechanical noise and mechanical shock when the 2-axis device operate.
However, as these reciprocate, the adjustment is at the point where both are satisfied.

- When gain is high, the noise when the 2-axis device operates increases.
- When gain is low, it is more susceptible to mechanical shock and skipping occurs more easily.

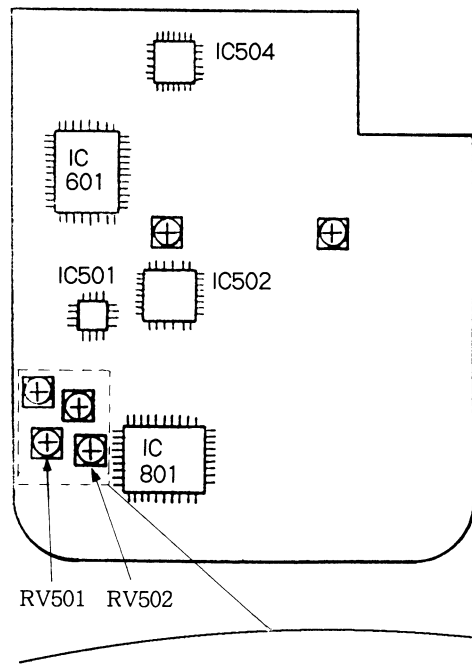
This adjustment is to be performed when replacing the following parts :

- UPF (optical pick-up block)
- RV501 (focus gain volume)
- RV502 (tracking gain volume)

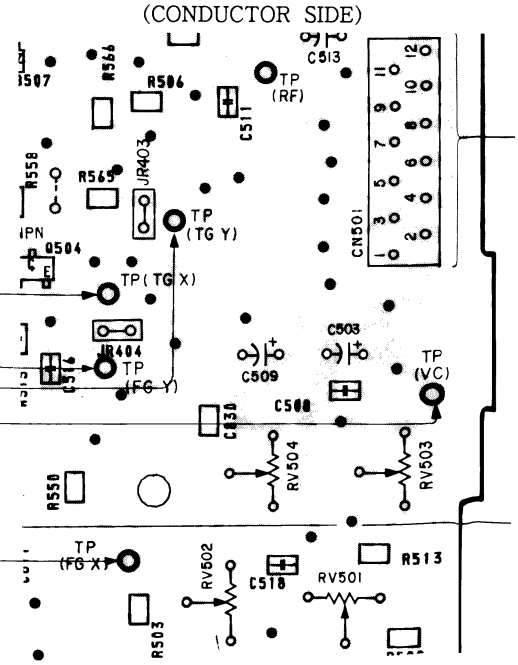
On this set, it is very difficult to simplify this adjustment. For those sets on which symptoms such as "occasional skipping" are hard to discover, or it is hard to tell if the set has been repaired, use the CD jig and perform this adjustment. Refer to the diagram below for connection of the CD jig. The adjustment procedure is described in the separate CD jig Instruction Manual.

Please be careful no to move RV501 (focus gain volume), RV502 (tracking gain volume) ordinarily.

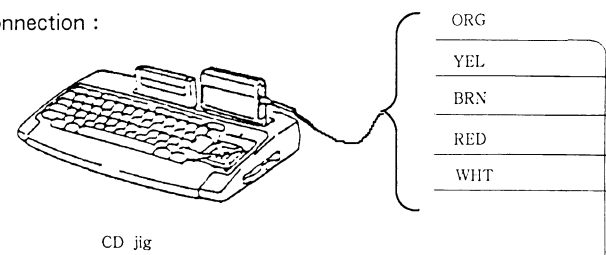
MAIN BOARD (COMPONENT SIDE)



(CONDUCTOR SIDE)



CD jig connection :



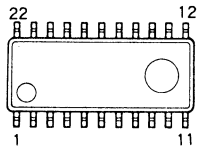
CD jig

Remove the solder jumpers at the TG and FG locations and connect the CD jig.

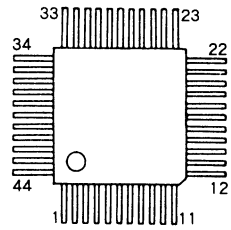
SECTION 4
DIAGRAMS

4-1. SEMICONDUCTOR LEAD LAYOUTS

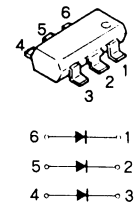
BA3570F
SM5840CS



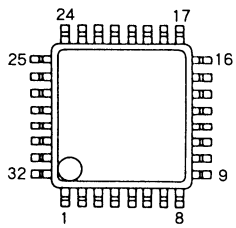
μPC1715



1MN10

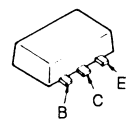


CXA1271Q

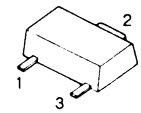


(TOP VIEW)

2SB1120
2SD999-CLCK

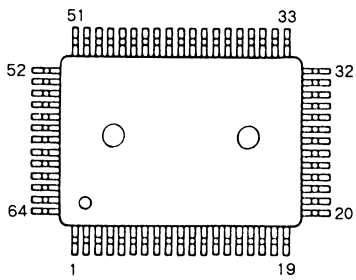


E10QS04



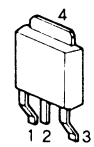
1 Anode
2 Cathode
3 NC

CXP5084-640Q



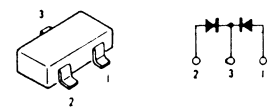
(TOP VIEW)

2SD1758F5-QR

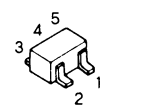


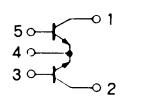
1 BASE
2 COLLECTOR
3 EMITTER
4 COLLECTOR

MA152WK



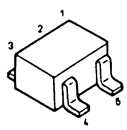
FMW1



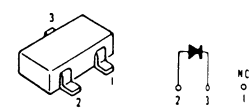


1 Tr1 : Collector 1
2 Tr2 : Collector 2
3 Tr2 : Base 2
4 Tr1,2 : Emitter
5 Tr1 : Base 1

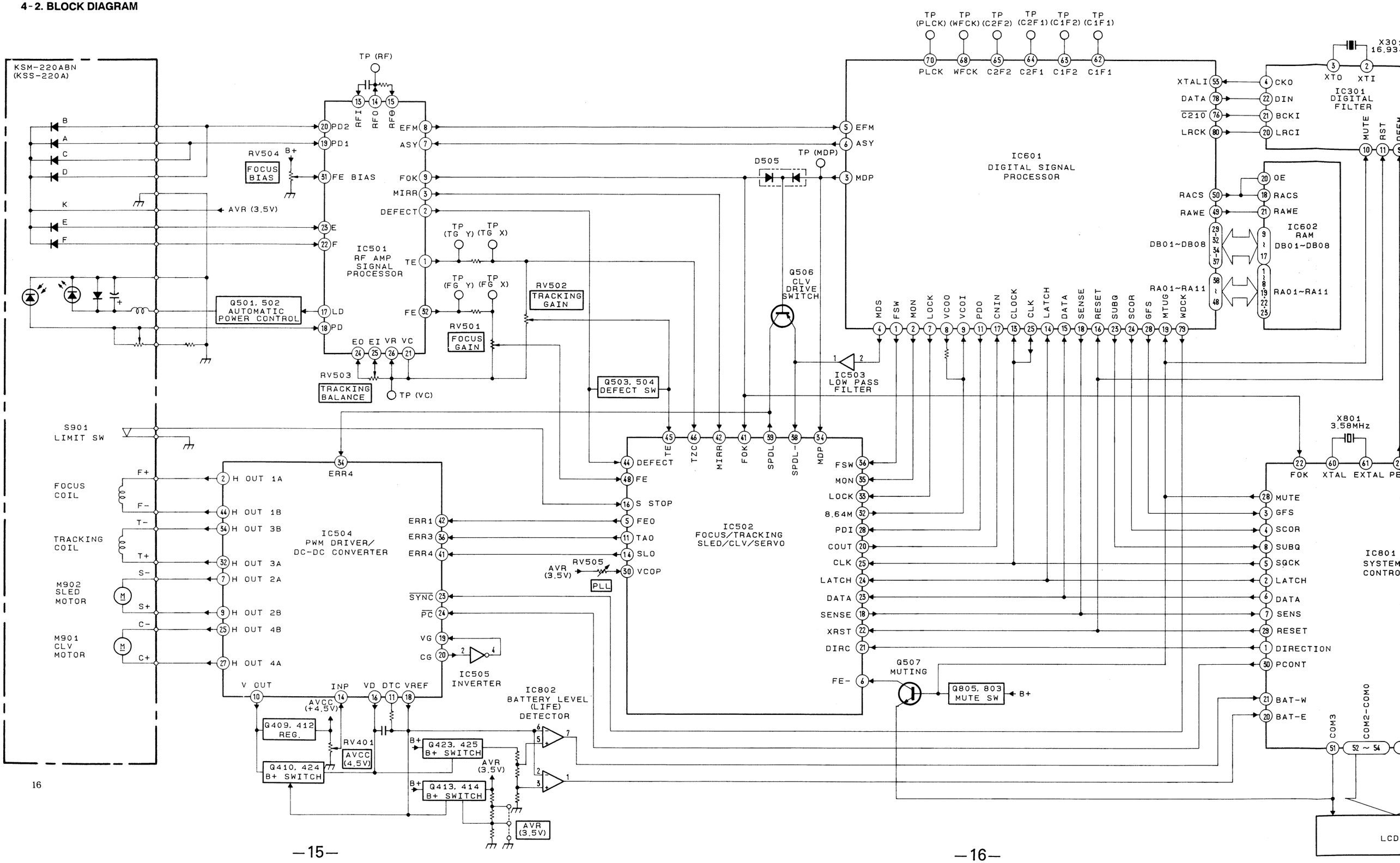
SC7S04F

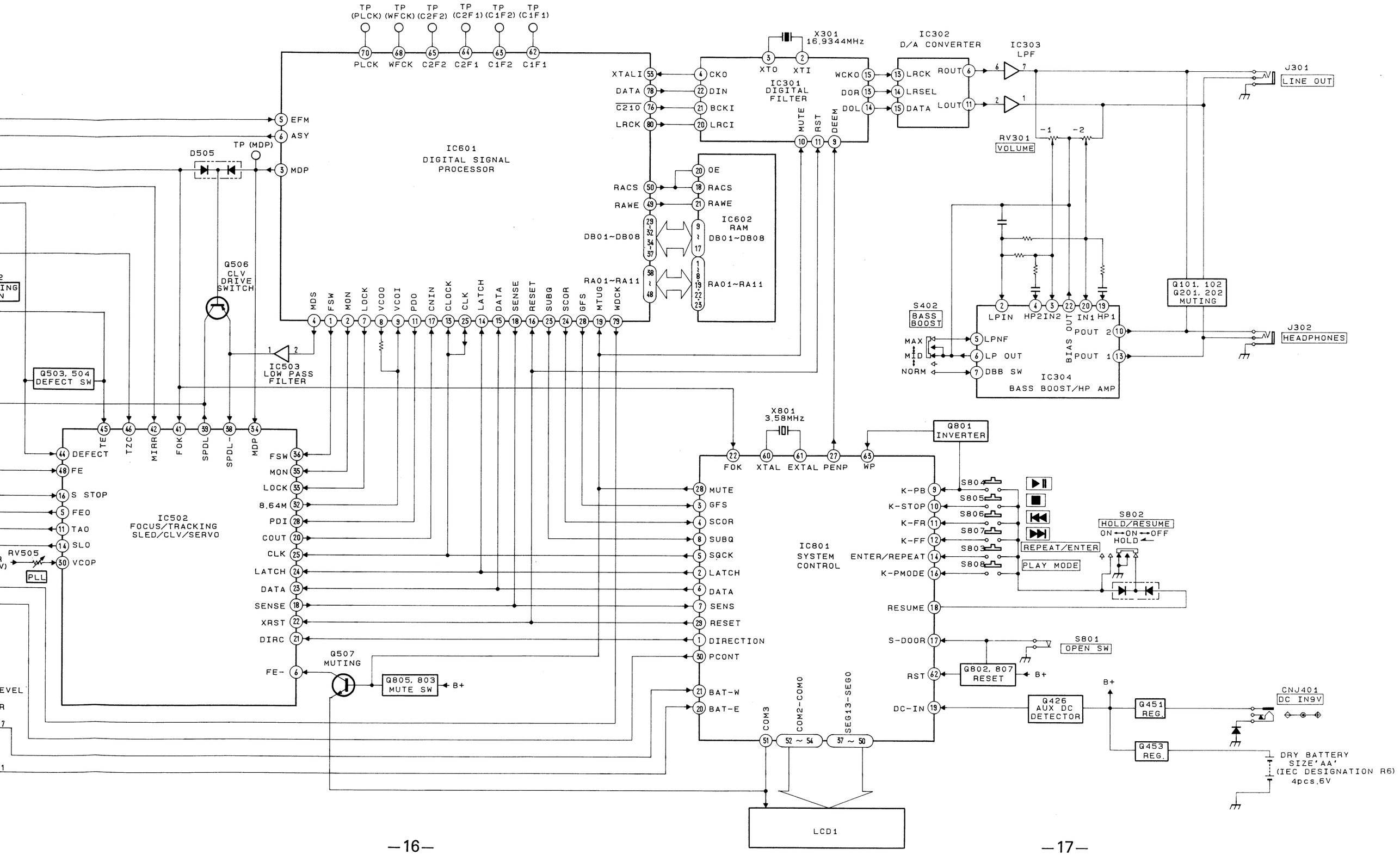


RB411D
RD10M-B1
RD5.1M-B2
RD7.5M-B1
SB01-05CP



4-2. BLOCK DIAGRAM




TP (PLCK)
TP (WFCK)
TP (C2F2)
TP (C2F1)
TP (C1F2)
TP (C1F1)
PLCK
WFCK
C2F2
C2F1
C1F2
C1F1
X301 16.9344MHz
XTO
XTI
IC302 D/A CONVERTER
IC303 LPF
J301 LINE OUT
WCKO
DOR
DOL
LRCK
LRSEL
DATA
ROUT
LOUT
IC301 DIGITAL FILTER
XTALI
DATA
C210
LRCK
CKO
DIN
BCKI
LRCI
MUTE
RST
DEEM
RV301 VOLUME
EFM
ASY
MDP
TP (MDP)
D505
IC601 DIGITAL SIGNAL PROCESSOR
OE
RACS
RAWE
DB01~DB08
RA01~RA11
IC602 RAM
Q506 CLV DRIVE SWITCH
MDS
FSW
MON
LOCK
VCOO
VCOI
PDO
CNIN
CLOCK
CLK
LATCH
DATA
SENSE
RESET
SUBQ
SCOR
GFS
MTUG
WDCK
IC503 LOW PASS FILTER
S402 BASS BOOST
LPIN
HP2IN2
IN1
HP1
BIAS OUT
POUT 2
POUT 1
MAX
MID
NORM
LPNF
LP OUT
DBB SW
IC304 BASS BOOST/HP AMP
Q101, 102 Q201, 202 MUTING
J302 HEADPHONES
Q503, 504 DEFECT SW
X801 3.58MHz
Q801 INVERTER
TE
TZC
MIRR
FOK
SPDL
SPDL-
MDP
DEFECT
FE
S STOP
FEO
TAO
SLO
VCOP
RV505
PLL
IC502 FOCUS/TRACKING SLED/CLV/SERVO
FSW
MON
8.64M
PDI
COUT
CLK
LATCH
DATA
SENSE
XRST
DIRC
FE-
Q507 MUTING
Q805, 803 MUTE SW
B+
FOK
XTAL
EXTAL
PENP
WP
MUTE
GFS
SCOR
SUBQ
SQCK
LATCH
DATA
SENS
RESET
DIRECTION
PCONT
BAT-W
BAT-E
IC801 SYSTEM CONTROL
K-PB
K-STOP
K-FR
K-FF
ENTER/REPEAT
K-PMODE
RESUME
S-DOOR
RST
DC-IN
S804
S805
S806
S807
S803
S808
REPEAT/ENTER
PLAY MODE
S802 HOLD/RESUME
ON ON OFF
HOLD
S801 OPEN SW
Q802, 807 RESET
Q426 AUX DC DETECTOR
Q451 REG.
Q453 REG.
CNJ401 DC IN9V
DRY BATTERY SIZE'AA' (IEC DESIGNATION R6) 4pcs.6V
COM3
COM2-COM0
SEG13-SEG0
52 ~ 54
37 ~ 50
LCD1

4-3. PRINTED WIRING BOARD

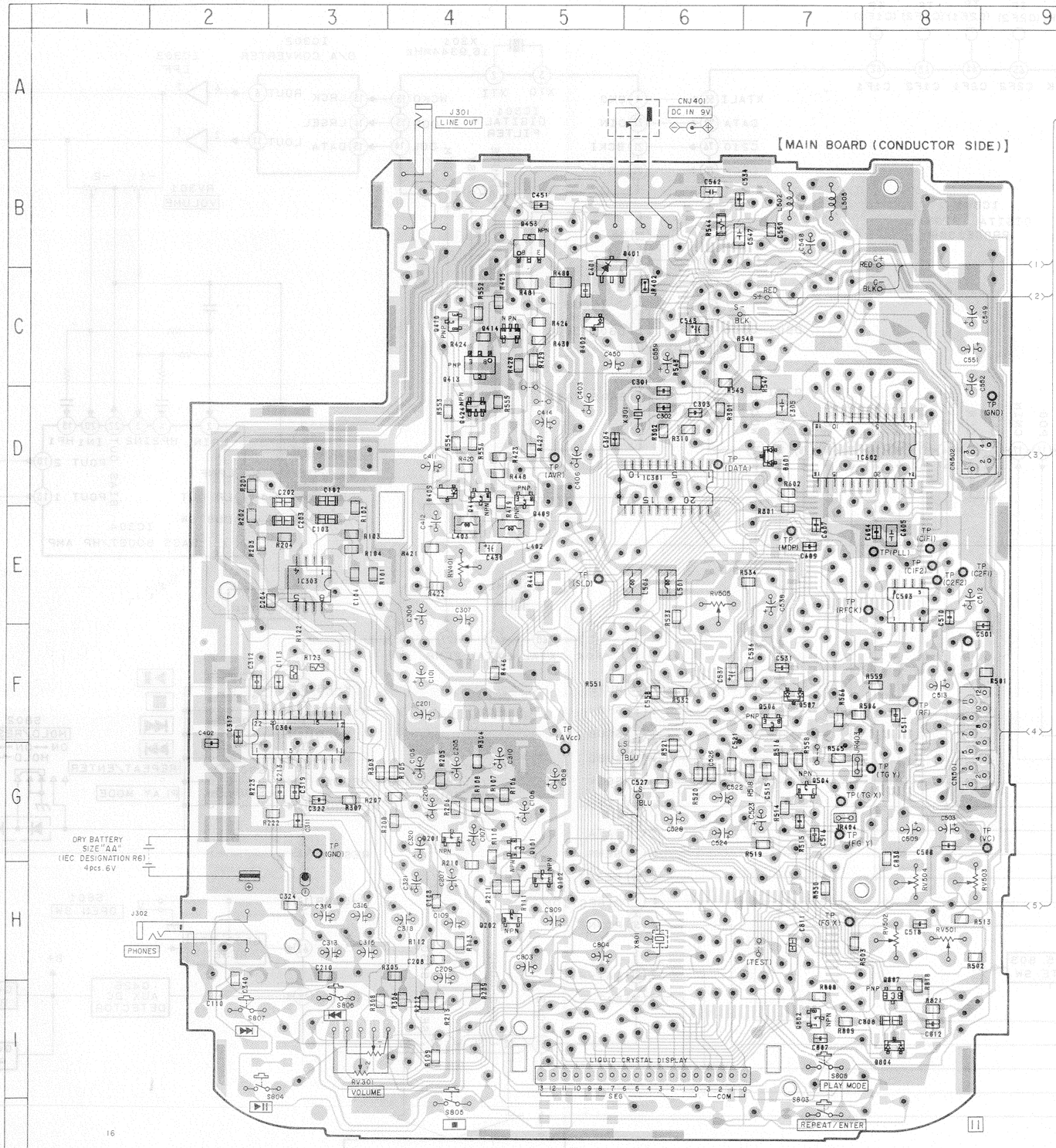
• See page 14 for Semiconductor Lead Layouts.

• Semiconductor Location

Ref. No.	Location
D401	B-5
D402	C-5
D405	D-14
D409	D-4
D501	B-14
D502	B-12
D503	B-12
D504	B-12
D505	F-12
D507	F-7
D601	D-7
D801	G-13
D804	I-8
D805	I-11
D806	G-13
IC301	D-6
IC302	F-14
IC303	E-3
IC304	F-3
IC501	G-11
IC502	F-12
IC503	E-8
IC504	C-12
IC505	B-13
IC601	E-11
IC602	D-8
IC801	H-12
IC802	I-11
Q101	G-5
Q102	H-5
Q201	G-4
Q202	H-5
Q409	D-5
Q410	C-4
Q412	D-4
Q413	C-4
Q414	C-5
Q423	E-14
Q424	D-4
Q425	D-14
Q426	E-14
Q451	D-14
Q453	B-5
Q501	E-10
Q502	F-10
Q503	G-11
Q504	G-7
Q506	F-7
Q507	H-14
Q801	H-13
Q802	I-7
Q803	H-14
Q805	H-14
Q807	I-8

Note on Mounting Diagram :

- ○—— : Parts extracted from the component side.
- ● : Through hole.
- ▒▒ : Pattern on the side which is seen.
- ▒▒ : Pattern of the rear side.



5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

[MAIN BOARD (CONDUCTOR SIDE)]

CNJ401
DC IN 9V

[MAIN BOARD (COMPONENT SIDE)]

S801
OPEN SW

S901
LIMIT SWITCH
(ON: OPTICAL PICK-UP BLOCK REACHES INNER POSITION

M902
SLED MOTOR

M901
CLV MOTOR

OPTICAL
PICK-UP BLOCK
KSM-220ABN

LIQUID CRYSTAL DISPLAY

PLAY MODE

REPEAT/ENTER

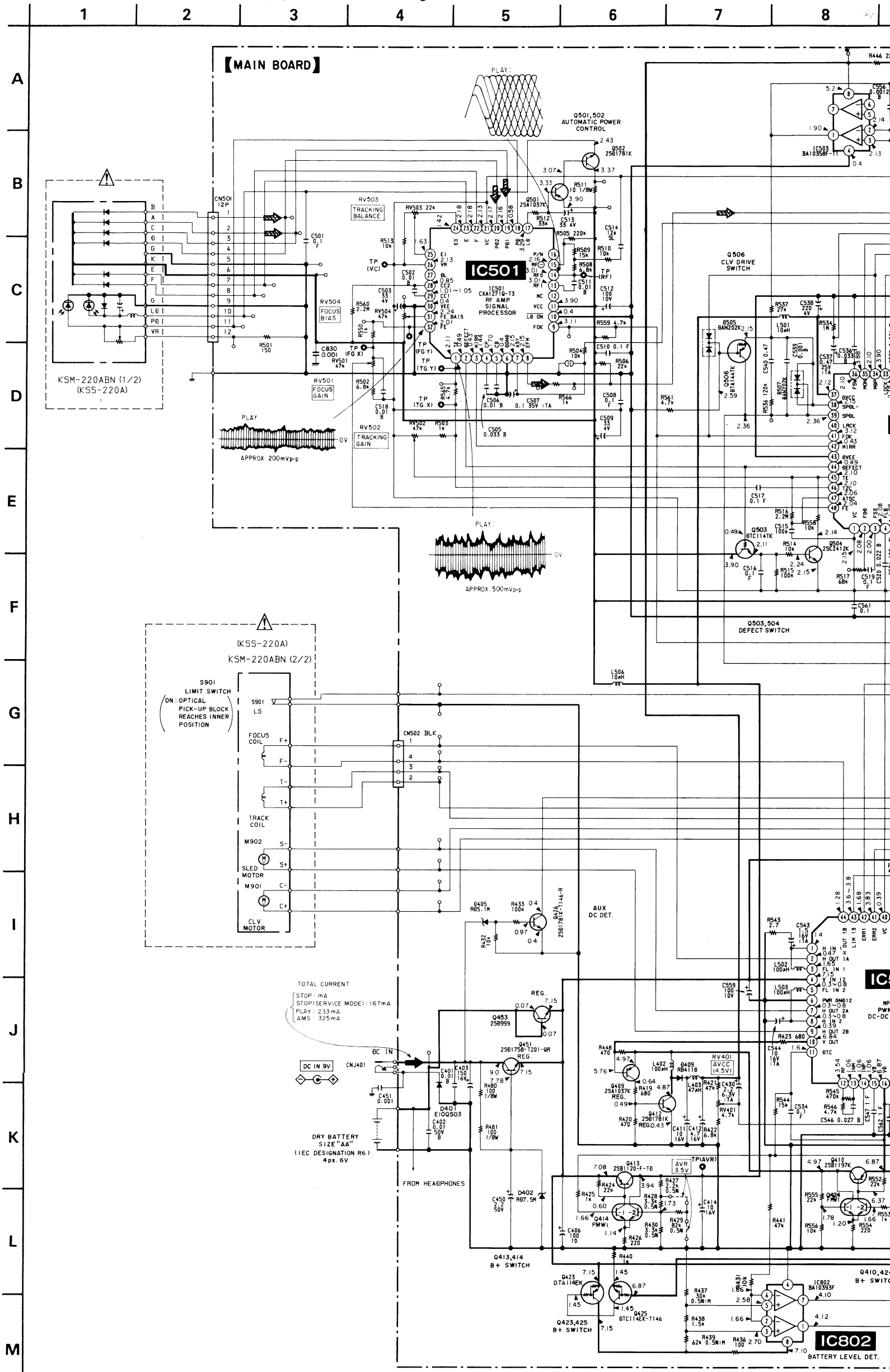
RESUME OFF ON
HOLD

S802
HOLD/
RESUME

NORM → MID → MAX

S402
BASS
BOOST

4-4. SCHEMATIC DIAGRAM • See page 24 for IC Block Diagrams.



16

Note on Schematic Diagram :

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- % : indicates tolerance.

Note:	**Note:**
The components identified by matk ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number sppecified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifie.

- ▬▬ : B + Line.
- ▭ : adjustment for repair.
- Power voltage is dc 6V and fed with regulated dc power supply from battery terminal.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
- Voltages are taken with a VOM (input impedance 10 MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Signal path. ▻▻ : CD

• See page 24 for IC Block Diagrams.

3 4 5 6 7 8 9 10 11 12 13 14

【MAIN BOARD】

(KSS-220A)
KSM-220ABN (2/2)

IC501
CXA2710-T3
RF AMP
SIGNAL
PROCESSOR

IC502
CXA2772Q-T1-Z
FOCUS/TRACKING
SLED/CLV SERVO

IC503
LOW PASS
FILTER

IC504
WPC1715FU
PWM DRIVER/
DC-DC CONVERTER

IC505
INVERTER

IC601
CXD1130Q
DIGITAL SIGNAL
PROCESSOR
/CLV SERVO

IC602
RAM

IC801
CXP5084-640Q
SYSTEM CONTROL

IC802
BATTERY LEVEL DET.

Q501,502
AUTOMATIC POWER
CONTROL

Q506
CLV DRIVE
SWITCH

Q503,504
DEFECT SWITCH

Q413,414
B+ SWITCH

Q410,424
B+ SWITCH

Q423,425
B+ SWITCH

AUX
DC DET.

RV503
TRACKING
BALANCE

RV504
FOCUS
BIAS

RV501
FOCUS
GAIN

RV502
TRACKING
GAIN

RV505
PLL

S901
LS

FOCUS
COIL

TRACK
COIL

M902
SLED
MOTOR

M901
CLV
MOTOR

CN502 BLK

TOTAL CURRENT
STOP : mA
STOP(SERVICE MODE) : 167mA
PLAY : 233mA
AMS : 325mA

DC IN
DC IN 9V
CNJ401

DRY BATTERY
SIZE "AA"
(IEC DESIGNATION R6)
4ps. 6V

FROM HEADPHONES

TP (VC)
TP (FG X)
TP (FG Y)
TP (TG Y)
TP (TG X)
TP (RF)
TP (MOP)
TP (PLL)
TP (RFCK)
TP (C1F2)
TP (C2F2)
TP (C1F1)
TP (C2F1)
TP (SLD)

PLAY:
APPROX. 200mVp-p

PLAY:
APPROX. 500mVp-p

5.6μSEC
230n SEC
190n SEC
30μSEC
1μSEC
100n SEC
4Vp-p
5.2Vp-p
1.6Vp-p
2Vp-p

IC503
LOW PASS FILTER

IC502
CXA1272Q-T1-Z
FOCUS/TRACKING SLED/CLV SERVO

IC601
CX81130Q
DIGITAL SIGNAL PROCESSOR /CLV SERVO

IC602
RAM

IC301
SM5840CS-E
DIGITAL FILTER

IC302
D/A CONVERTER

IC303
LPF

IC304
BASS BOOST/HP AMP

IC801
CXP5084-640Q
SYSTEM CONTROL

IC505
TC7S04F
INVERTER

IC504
C1715FU
DRIVER/ CONVERTER

RV505 PLL

TP (MOP) TP (PLL) TP (RFCK) TP (C1F2) TP (C2F1) TP (C1F2) TP (C1F1) TP (DATA) TP (AVCC) TP (SLD)

X801 3.58MHz

16.9344MHz

Q101,201 MUTING
Q102,202 MUTING
Q507 MUTING
Q805,803 MUTE SWITCH
Q802,807 RESET

RV301 VOLUME

J301 LINE OUT
J302 HEADPHONES

TO BATT+

HOLD/RESUME
RESUME ON ON OFF
HOLD ON OFF OFF
S802

OPEN SW
S801

S808 PLAY-MODE
S807
S806 AMS/SEARCH
S805
S804
S803 ENTER/REPEAT

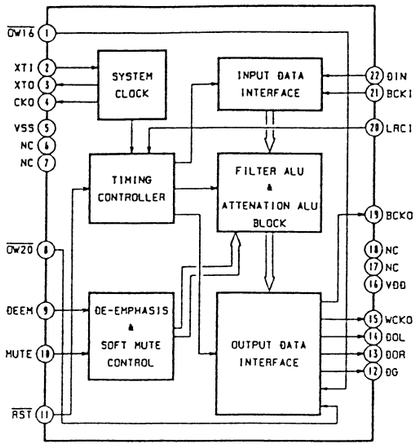
MAX MID NORM S402 BASS BOOST

LCD

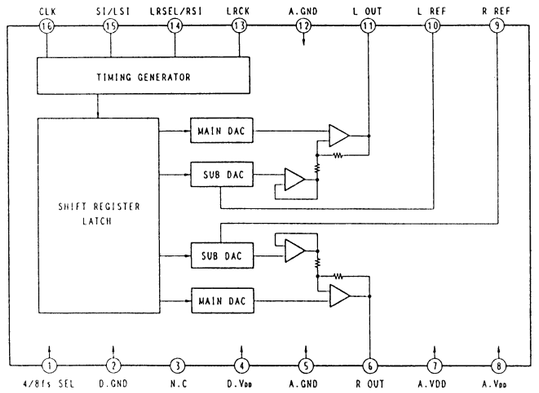
⊙WAVEFORM CHANGES DEPENDING ON INDICATION.

4-5. IC BLOCK DIAGRAMS

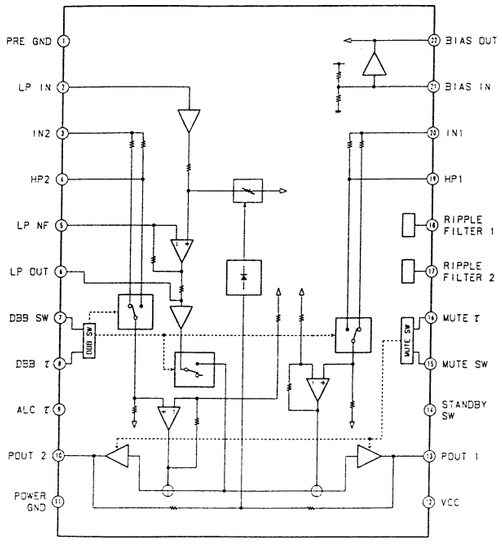
IC301 SM5840CS



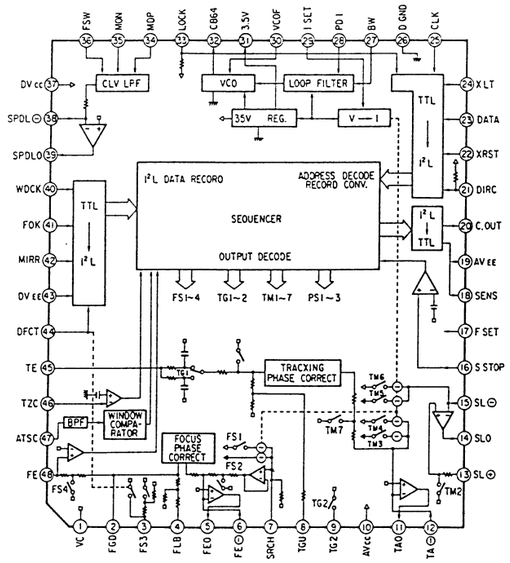
IC302 μPD6376



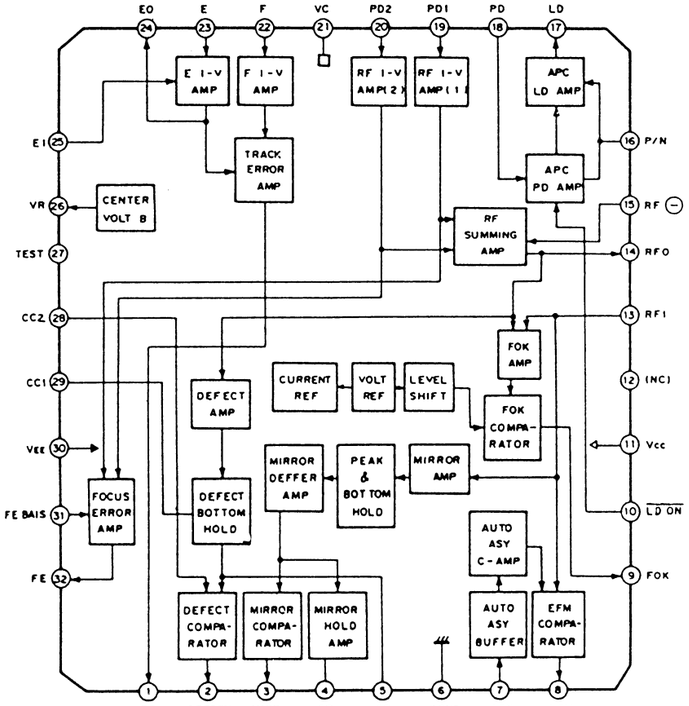
IC304 BA3570F



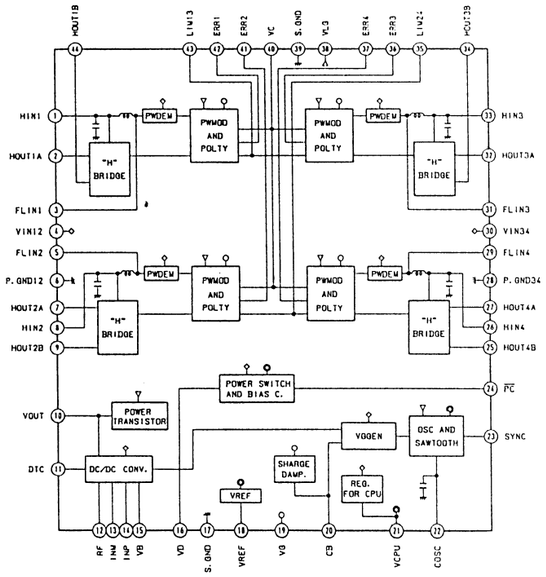
IC502 CXA1272Q-Z



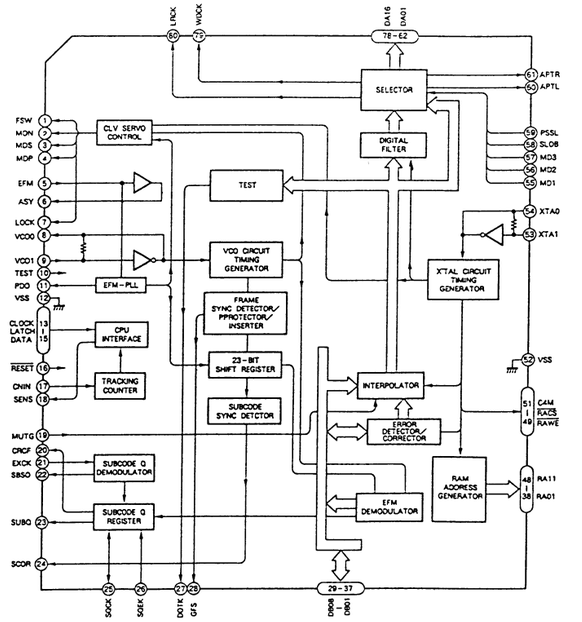
IC501 CXA1271Q



IC504 μPC1715FU



IC601 CXD1130Q



SECTION 5
EXPLODED VIEWS

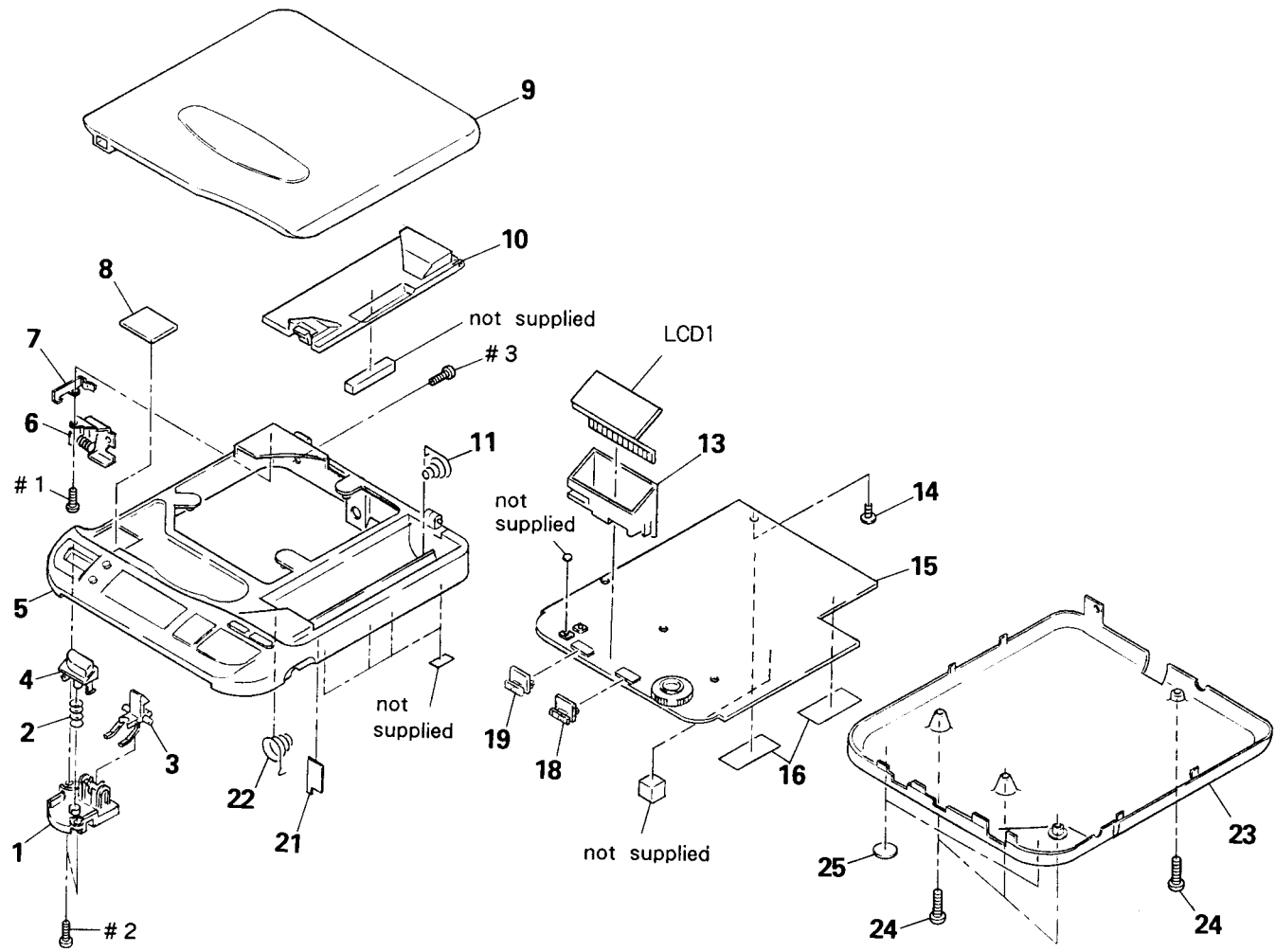
NOTE :

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
  Example :
  KNOB, BALANCE (WHITE)...(RED)
  ↑ ↑
  Parts color Cabinet's color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifé.

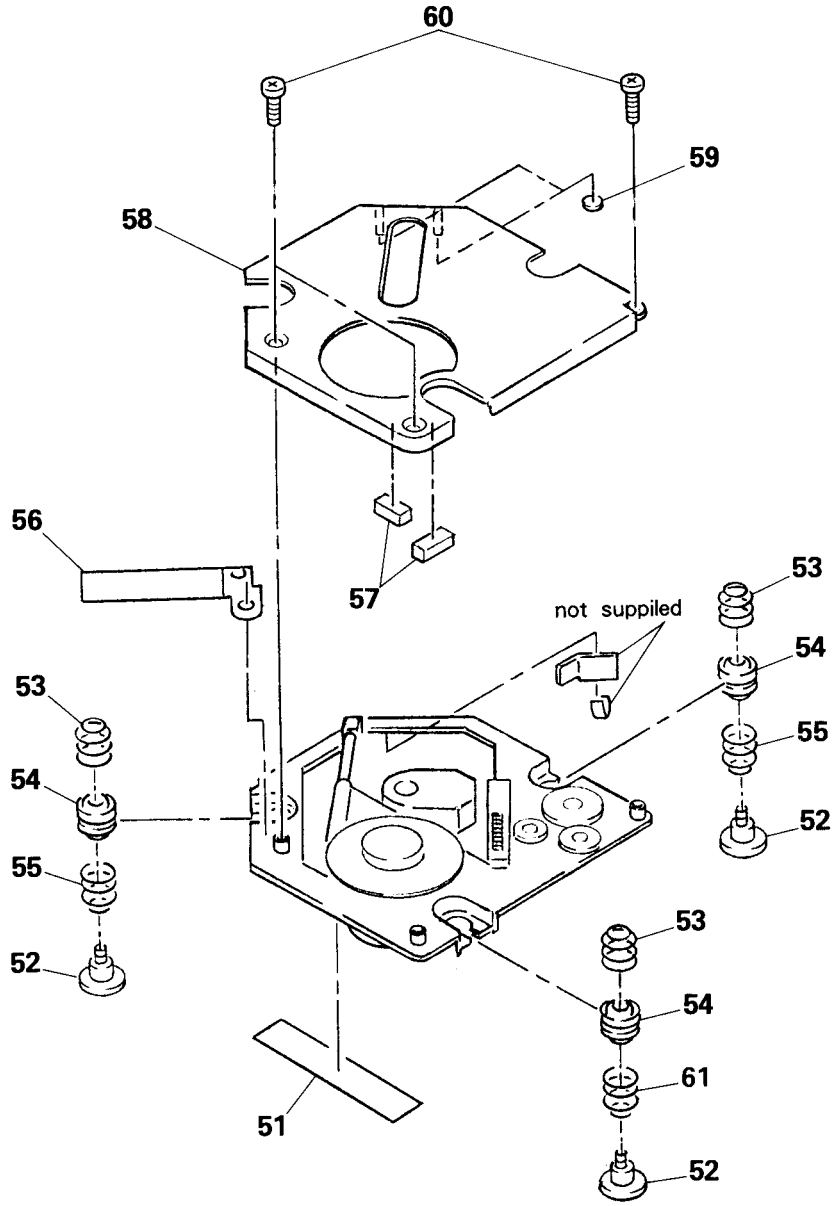
5-1. CABINET SECTION



Ref. No.	Part No.	Description	Remarks
1	* 4-945-471-01	BASE, OPEN	
2	4-945-989-01	SPRING(4), COMPRESSION COIL	
3	4-495-474-01	CLAW, LID LOCK (BLK)	
	4-945-474-11	CLAW, LID LOCK (BLU)	
4	4-945-455-01	KNOB (OPEN) (BLK)	
	4-945-455-11	KNOB (OPEN) (BLU)	
5	X-4941-644-1	CABINET ASSY (BLK)	
	X-4941-954-1	CABINET ASSY (BLU)	
6	X-4941-646-1	SPRING ASSY OPEN	
7	4-945-460-01	SPRING (C)	
8	4-945-463-01	SHEET (A)	
9	X-4941-652-1	PANEL ASSY UPPER (BLK)	
	X-4941-956-1	PANEL ASSY UPPER (BLU)	
10	4-945-473-01	LID, BATTERY CASE (BLK)	
	4-945-473-11	LID, BATTERY CASE (BLU)	
11	2-298-630-11	SPRING (R), BATTERY COIL	

Ref. No.	Part No.	Description	Remarks
13	* 4-945-466-01	HOLDER (LCD)	
14	4-947-203-01	SCREW (M2X6), TAPPING	
15	A-3275-095-A	MAIN BOARD, COMPLETE	
16	* 4-926-115-01	CUSHION (P)	
18	4-945-469-01	KNOB (BASS) (BLK)	
	4-945-469-11	KNOB (BASS) (BLU)	
19	4-945-470-01	KNOB (HOLD) (BLK)	
	4-945-470-11	KNOB (HOLD) (BLU)	
21	4-945-462-01	TERMINAL BOARD, BATTERY	
22	4-945-456-01	SPRING (B), BATTERY COIL	
23	X-4941-645-1	PANEL ASSY BOTTOM (BLK)	
	X-4941-957-1	PANEL ASSY BOTTOM (BLU)	
24	3-336-395-01	SCREW (B2X10) (G), TAPPING	
25	4-912-641-01	FOOT, RUBBER	
LCD1	1-109-406-11	DISPLAY PANEL, LIQUID CRYSTAL	

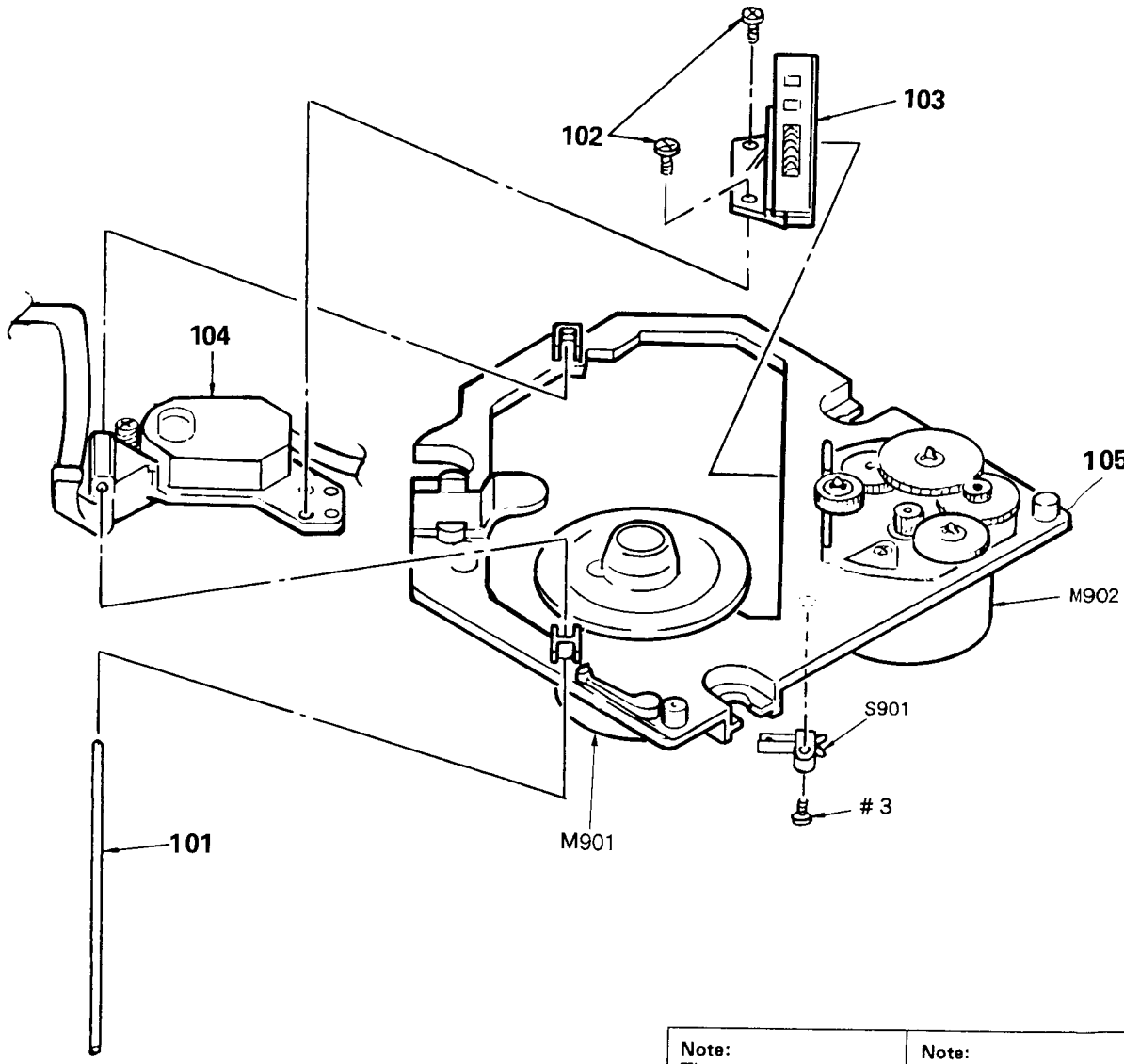
5-2. CHASSIS SECTION



Ref. No.	Part No.	Description	Remarks
51	3-831-441-XX	SHEET, BLIND	
52	4-924-718-01	SCREW, INSULATOR	
53	4-947-040-01	SPRING, COMPRESSION	
54	4-924-705-01	INSULATOR	
55	4-947-040-21	SPRING, COMPRESSION	
56	4-946-959-01	PAPER (B), SHIELD	

Ref. No.	Part No.	Description	Remarks
57	* 3-329-460-01	SPACER	
58	4-924-735-31	COVER, MD	
59	4-917-784-01	SPACER (S)	
60	3-893-942-01	SCREW (1.7X4), TAPPING (B)	
61	4-947-040-11	SPRING, COMPRESSION	

5-3. MECHANISM SECTION (KSM-220ABN)



Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remarks
101	*	2-641-534-01 SHAFT	
102		2-641-383-01 SCREW (M1.7X4) (NK), TOOTH	
103		X-2641-528-1 RACK ASSY	
104	⚠	8-848-142-11 DEVICE, OPTICAL KSS-220A	
105		X-2625-248-1 CHASSIS ASSY (Including M901, M902)	
S901		1-570-112-11 SWITCH, LEAF (LIMIT)	

MAIN

SECTION 6
ELECTRICAL PARTS LIST

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spéci-fie.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be defferent from the parts specified in the diagrams or the components used on the set.
- −XX, −X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL : metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : μ, for example :
  uA... : μA... , uPA... , μPA... , uPB... , μPB... , uPC... , μPC... , uPD..., μPD...
- CAPACITORS :
  uF : μF
- COILS
  uH : μH

Ref. No.	Part No.	Description			Remarks
	A-3275-095-A	MAIN BOARD, COMPLETE			
		**********			
	* 4-945-466-01	HOLDER (LCD)			
		< CAPACITOR >			
C101	1-126-157-11	ELECT	10uF	20% 16V	
C102	1-163-213-00	CERAMIC CHIP	0.0022uF	5% 50V	
C103	1-163-201-00	CERAMIC CHIP	680PF	5% 50V	
C104	1-163-102-00	CERAMIC CHIP	24PF	5% 50V	
C105	1-126-301-11	ELECT	1uF	20% 50V	
C106	1-126-157-11	ELECT	10uF	20% 16V	
C107	1-126-163-11	ELECT	4.7uF	20% 50V	
C108	1-163-986-00	CERAMIC CHIP	0.027uF	10% 25V	
C109	1-126-177-11	ELECT	100uF	20% 10V	
C110	1-163-117-00	CERAMIC CHIP	100PF	5% 50V	
C111	1-163-117-00	CERAMIC CHIP	100PF	5% 50V	
C113	1-164-161-11	CERAMIC CHIP	0.0022uF	10% 100V	
C201	1-126-157-11	ELECT	10uF	20% 16V	
C202	1-163-213-00	CERAMIC CHIP	0.0022uF	5% 50V	
C203	1-163-201-00	CERAMIC CHIP	680PF	5% 50V	
C204	1-163-102-00	CERAMIC CHIP	24PF	5% 50V	
C205	1-126-301-11	ELECT	1uF	20% 50V	
C206	1-126-157-11	ELECT	10uF	20% 16V	
C207	1-126-163-11	ELECT	4.7uF	20% 50V	
C208	1-163-986-00	CERAMIC CHIP	0.027uF	10% 25V	
C209	1-126-177-11	ELECT	100uF	20% 10V	
C210	1-163-117-00	CERAMIC CHIP	100PF	5% 50V	
C211	1-163-117-00	CERAMIC CHIP	100PF	5% 50V	
C213	1-164-161-11	CERAMIC CHIP	0.0022uF	10% 100V	
C301	1-163-095-00	CERAMIC CHIP	12PF	5% 50V	

Ref. No.	Part No.	Description			Remarks
C302	1-163-095-00	CERAMIC CHIP	12PF	5% 50V	
C303	1-163-105-00	CERAMIC CHIP	33PF	5% 50V	
C304	1-163-809-11	CERAMIC CHIP	0.047uF	10% 25V	
C305	1-162-638-11	CERAMIC CHIP	1uF	16V	
C306	1-124-229-00	ELECT	33uF	20% 10V	
C307	1-124-229-00	ELECT	33uF	20% 10V	
C308	1-126-177-11	ELECT	100uF	20% 10V	
C309	1-164-232-11	CERAMIC CHIP	0.01uF	50V	
C310	1-126-177-11	ELECT	100uF	20% 10V	
C311	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C312	1-163-141-00	CERAMIC CHIP	0.001uF	5% 50V	
C313	1-124-229-00	ELECT	33uF	20% 10V	
C314	1-124-638-11	ELECT	22uF	20% 10V	
C315	1-126-163-11	ELECT	4.7uF	20% 50V	
C316	1-124-464-11	ELECT	0.22uF	20% 50V	
C317	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C318	1-126-163-11	ELECT	4.7uF	20% 50V	
C319	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C320	1-124-464-11	ELECT	0.22uF	20% 50V	
C321	1-124-638-11	ELECT	22uF	20% 10V	
C322	1-163-141-00	CERAMIC CHIP	0.001uF	5% 50V	
C323	1-164-232-11	CERAMIC CHIP	0.01uF	50V	
C324	1-163-007-11	CERAMIC CHIP	680PF	10% 50V	
C330	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
C340	1-164-232-11	CERAMIC CHIP	0.01uF	50V	
C401	1-164-232-11	CERAMIC CHIP	0.01uF	50V	
C402	1-164-232-11	CERAMIC CHIP	0.01uF	50V	
C403	1-126-357-11	ELECT	150uF	20% 16V	
C406	1-124-584-00	ELECT	100uF	20% 10V	
C411	1-126-157-11	ELECT	10uF	20% 16V	

MAIN

Ref. No.	Part No.	Description			Remarks
C412	1-126-163-11	ELECT	4.7uF	20% 50V	
C414	1-126-157-11	ELECT	10uF	20% 16V	
C430	1-135-149-21	TANTALUM CHIP	2.2uF	20% 10V	
C450	1-124-257-00	ELECT	2.2uF	20% 50V	
C451	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
C501	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C502	1-164-232-11	CERAMIC CHIP	0.01uF	50V	
C503	1-124-431-00	ELECT	33uF	20% 4V	
C505	1-163-078-11	CERAMIC CHIP	0.033uF	10% 25V	
C506	1-164-232-11	CERAMIC CHIP	0.01uF	50V	
C507	1-135-070-00	TANTALUM CHIP	0.1uF	10% 35V	
C508	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C509	1-124-431-00	ELECT	33uF	20% 4V	
C510	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C511	1-164-232-11	CERAMIC CHIP	0.01uF	50V	
C512	1-124-584-00	ELECT	100uF	20% 10V	
C513	1-124-431-00	ELECT	33uF	20% 4V	
C514	1-163-095-00	CERAMIC CHIP	12PF	5% 50V	
C515	1-163-117-00	CERAMIC CHIP	100PF	5% 50V	
C516	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C517	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C518	1-164-232-11	CERAMIC CHIP	0.01uF	50V	
C519	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C520	1-163-037-11	CERAMIC CHIP	0.022uF	10% 25V	
C521	1-163-117-00	CERAMIC CHIP	100PF	5% 50V	
C522	1-124-239-00	ELECT	6.9uF	20% 10V	
C523	1-124-239-00	ELECT	6.9uF	20% 10V	
C524	1-124-638-11	ELECT	22uF	20% 10V	
C525	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C526	1-163-117-00	CERAMIC CHIP	100PF	5% 50V	
C527	1-164-222-11	CERAMIC CHIP	0.22uF	25V	
C528	1-124-638-11	ELECT	22uF	20% 10V	
C529	1-163-125-00	CERAMIC CHIP	220PF	5% 50V	
C531	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C532	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C533	1-162-638-11	CERAMIC CHIP	1uF	16V	
C534	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C535	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
C536	1-163-989-11	CERAMIC CHIP	0.033uF	10% 25V	
C537	1-135-145-11	TANTALUM CHIP	0.47uF	10% 25V	
C538	1-124-434-00	ELECT	220uF	20% 4V	
C539	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
C540	1-162-637-11	CERAMIC CHIP	0.47uF	16V	
C543	1-135-148-21	TANTAL. CHIP	1.5uF	10% 16V	
C544	1-135-159-21	TANTALUM CHIP	10uF	10% 16V	

Ref. No.	Part No.	Description			Remarks
C546	1-163-986-00	CERAMIC CHIP	0.027uF	10% 25V	
C547	1-162-638-11	CERAMIC CHIP	1uF	16V	
C548	1-126-162-11	ELECT	3.3uF	20% 50V	
C549	1-126-157-11	ELECT	10uF	20% 16V	
C550	1-163-141-00	CERAMIC CHIP	0.001uF	5% 50V	
C551	1-126-157-11	ELECT	10uF	20% 16V	
C552	1-126-160-11	ELECT	1uF	20% 50V	
C553	1-162-638-11	CERAMIC CHIP	1uF	16V	
C554	1-162-637-11	CERAMIC CHIP	0.47uF	16V	
C555	1-163-081-00	CERAMIC CHIP	0.22uF	25V	
C556	1-163-010-11	CERAMIC CHIP	0.0012uF	10% 50V	
C557	1-163-017-00	CERAMIC CHIP	0.0047uF	5% 50V	
C558	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C559	1-124-584-00	ELECT	100uF	20% 10V	
C561	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C562	1-162-638-11	CERAMIC CHIP	1uF	16V	
C601	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C604	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C605	1-162-638-11	CERAMIC CHIP	1uF	16V	
C606	1-163-117-00	CERAMIC CHIP	100PF	5% 50V	
C607	1-163-037-11	CERAMIC CHIP	0.022uF	10% 25V	
C608	1-163-117-00	CERAMIC CHIP	100PF	5% 50V	
C609	1-163-117-00	CERAMIC CHIP	100PF	5% 50V	
C803	1-124-257-00	ELECT	2.2uF	20% 50V	
C804	1-124-257-00	ELECT	2.2uF	20% 50V	
C807	1-164-232-11	CERAMIC CHIP	0.01uF	50V	
C808	1-162-638-11	CERAMIC CHIP	1uF	16V	
C809	1-124-239-00	ELECT	6.8uF	20% 25V	
C810	1-162-638-11	CERAMIC CHIP	1uF	16V	
C811	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C812	1-164-222-11	CERAMIC CHIP	0.22uF	25V	
C830	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	

< CONNECTOR >

CN501	1-566-976-11	SOCKET, CONNECTOR 12P
CN502	1-565-309-21	CONNECTOR, FLEXIBLE 4P
CNJ401	1-580-428-11	JACK, DC (DC IN 9V)

< DIODE >

D401	8-719-200-36	DIODE E10QS04
D402	8-719-106-22	DIODE RD7.5M-B1
D405	8-719-105-82	DIODE RD5.1M-B2
D409	8-719-975-40	DIODE RB411D
D501	8-719-938-72	DIODE SB01-05CP

Ref. No.	Part No.	Description	Remarks
D502	8-719-938-72	DIODE SB01-05CP	
D503	8-719-938-72	DIODE SB01-05CP	
D504	8-719-106-52	DIODE RD10M-B1	
D505	8-719-400-18	DIODE MA152WK	
D507	8-719-400-18	DIODE MA152WK	
D601	8-719-400-18	DIODE MA152WK	
D801	8-719-951-22	DIODE 1MN10	
D804	8-719-400-18	DIODE MA152WK	
D805	8-719-400-18	DIODE MA152WK	
D806	8-719-938-72	DIODE SB01-05CP	
		< IC >	
IC301	8-759-501-31	IC SM5840CS	
IC302	8-759-148-30	IC uPD6376	
IC303	8-759-710-55	IC NJM2100M	
IC304	8-759-991-27	IC BA3570F	
IC501	8-752-033-55	IC CXA1271Q	
IC502	8-752-033-54	IC CXA1272Q	
IC503	8-759-970-89	IC BA10358F	
IC504	8-759-030-17	IC MPC1715FU	
IC505	8-759-031-84	IC SC7S04F	
IC601	8-752-328-46	IC CXD1130Q	
IC602	8-759-805-49	IC CXK5816MS-15L	
IC801	8-752-831-23	IC CXP5084-640Q	
IC802	8-759-982-73	IC BA10393F	
		< JACK >	
J301	1-580-709-11	JACK (LINE OUT)	
J302	1-580-709-21	JACK (HEADPHONES)	
		< JUMPER >	
JR401	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR402	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR403	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR404	1-216-295-00	METAL CHIP 0 5% 1/10W	
		< COIL >	
L402	1-412-032-11	INDUCTOR, CHIP 100uH	
L403	1-412-031-11	INDUCTOR, CHIP 47uH	
L501	1-412-029-11	INDUCTOR, CHIP 10uH	
L502	1-408-421-00	INDUCTOR 100uH	
L503	1-412-032-11	INDUCTOR, CHIP 100uH	
L504	1-412-032-11	INDUCTOR, CHIP 100uH	
L505	1-408-421-00	INDUCTOR 100uH	
L506	1-412-029-11	INDUCTOR, CHIP 10uH	

Ref. No.	Part No.	Description	Remarks
		< LCD >	
LCD1	1-809-406-11	DISPLAY PANEL, LIQUID CRYSTAL	
		< TRANSISTOR >	
Q101	8-729-921-72	TRANSISTOR 2SD1781K-R	
Q102	8-729-921-72	TRANSISTOR 2SD1781K-R	
Q201	8-729-921-72	TRANSISTOR 2SD1781K-R	
Q202	8-729-921-72	TRANSISTOR 2SD1781K-R	
Q409	8-729-216-22	TRANSISTOR 2SA1162-G	
Q410	8-729-904-87	TRANSISTOR 2SB1197K-R	
Q412	8-729-921-72	TRANSISTOR 2SD1781K-R	
Q413	8-729-806-75	TRANSISTOR 2SB1120	
Q414	8-729-903-10	TRANSISTOR FMW1	
Q423	8-729-901-04	TRANSISTOR DTA114EK	
Q424	8-729-903-10	TRANSISTOR FMW1	
Q425	8-729-900-53	TRANSISTOR DTC114EK	
Q426	8-729-921-72	TRANSISTOR 2SD1781K-R	
Q451	8-729-922-34	TRANSISTOR 2SD1758F5-QR	
Q453	8-729-140-75	TRANSISTOR 2SD999-CLCK	
Q501	8-729-216-22	TRANSISTOR 2SA1162-G	
Q502	8-729-921-72	TRANSISTOR 2SD1781K-R	
Q503	8-729-902-XX	TRANSISTOR DTC114TK	
Q504	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q506	8-729-903-29	TRANSISTOR DTA144TK	
Q507	8-729-903-30	TRANSISTOR DTC144TK	
Q801	8-729-901-05	TRANSISTOR DTA124EK	
Q802	8-729-921-72	TRANSISTOR 2SD1781K-R	
Q803	8-729-901-04	TRANSISTOR DTA114EK	
Q805	8-729-900-53	TRANSISTOR DTC114EK	
Q807	8-729-216-22	TRANSISTOR 2SA1162-G	
		< RESISTOR >	
R101	1-216-668-11	METAL CHIP 5.1K 0.5% 1/10W	
R102	1-216-686-11	METAL CHIP 30K 0.5% 1/10W	
R103	1-216-689-11	METAL CHIP 39K 0.5% 1/10W	
R104	1-216-695-11	METAL CHIP 68K 0.5% 1/10W	
R105	1-216-105-00	METAL CHIP 220K 5% 1/10W	
R106	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R107	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R108	1-216-033-00	METAL CHIP 220 5% 1/10W	
R109	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R110	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	

MAIN

Ref. No.	Part No.	Description			Remarks
R111	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R112	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R113	1-216-009-00	METAL CHIP	22	5% 1/10W	
R122	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R123	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R201	1-216-668-11	METAL CHIP	5.1K	0.5% 1/10W	
R202	1-216-686-11	METAL CHIP	30K	0.5% 1/10W	
R203	1-216-689-11	METAL CHIP	39K	0.5% 1/10W	
R204	1-216-695-11	METAL CHIP	68K	0.5% 1/10W	
R205	1-216-105-00	METAL CHIP	220K	5% 1/10W	
R206	1-216-089-00	METAL CHIP	47K	5% 1/10W	
R207	1-216-053-00	METAL CHIP	1.5K	5% 1/10W	
R208	1-216-033-00	METAL CHIP	220	5% 1/10W	
R209	1-216-071-00	METAL CHIP	8.2K	5% 1/10W	
R210	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R211	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R212	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R213	1-216-009-00	METAL CHIP	22	5% 1/10W	
R222	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R223	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R301	1-216-121-00	METAL CHIP	1M	5% 1/10W	
R302	1-216-001-00	METAL CHIP	10	5% 1/10W	
R303	1-216-077-00	METAL CHIP	15K	5% 1/10W	
R304	1-216-077-00	METAL CHIP	15K	5% 1/10W	
R305	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R306	1-216-051-00	METAL CHIP	1.2K	5% 1/10W	
R307	1-216-121-00	METAL CHIP	1M	5% 1/10W	
R308	1-216-007-00	METAL CHIP	18	5% 1/10W	
R310	1-216-001-00	METAL CHIP	10	5% 1/10W	
R330	1-216-298-00	METAL CHIP	2.2	5% 1/10W	
R419	1-216-045-00	METAL CHIP	680	5% 1/10W	
R420	1-216-041-00	METAL CHIP	470	5% 1/10W	
R421	1-216-089-00	METAL CHIP	47K	5% 1/10W	
R422	1-216-069-00	METAL CHIP	6.8K	5% 1/10W	
R423	1-216-045-00	METAL CHIP	680	5% 1/10W	
R424	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R425	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R426	1-216-033-00	METAL CHIP	220	5% 1/10W	
R427	1-216-659-11	METAL CHIP	2.2K	0.5% 1/10W	
R428	1-216-663-11	METAL CHIP	3.3K	0.5% 1/10W	
R429	1-216-697-11	METAL CHIP	82K	0.5% 1/10W	
R430	1-216-663-11	METAL CHIP	3.3K	0.5% 1/10W	
R431	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R432	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R433	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R436	1-216-025-00	METAL CHIP	100	5% 1/10W	
R437	1-216-686-11	METAL CHIP	30K	0.5% 1/10W	
R438	1-216-053-00	METAL CHIP	1.5K	5% 1/10W	
R439	1-216-694-11	METAL CHIP	62K	0.5% 1/10W	
R440	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R441	1-216-089-00	METAL CHIP	47K	5% 1/10W	
R446	1-216-009-00	METAL CHIP	22	5% 1/10W	
R448	1-216-041-00	METAL CHIP	470	5% 1/10W	
R480	1-216-174-00	METAL GLAZE	100	5% 1/8W	
R481	1-216-174-00	METAL GLAZE	100	5% 1/8W	
R501	1-216-029-00	METAL CHIP	150	5% 1/10W	
R502	1-216-069-00	METAL CHIP	6.8K	5% 1/10W	
R503	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R504	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R505	1-216-105-00	METAL CHIP	220K	5% 1/10W	
R506	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R508	1-216-069-00	METAL CHIP	6.8K	5% 1/10W	
R509	1-216-077-00	METAL CHIP	15K	5% 1/10W	
R510	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R511	1-216-150-00	METAL GLAZE	10	5% 1/8W	
R512	1-216-085-00	METAL CHIP	33K	5% 1/10W	
R513	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R514	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R515	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R516	1-216-129-00	METAL CHIP	2.2M	5% 1/10W	
R517	1-216-093-00	METAL CHIP	68K	5% 1/10W	
R518	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R519	1-216-119-00	METAL CHIP	820K	5% 1/10W	
R520	1-216-748-11	METAL CHIP	39K	5% 1/10W	
R521	1-216-095-00	METAL CHIP	82K	5% 1/10W	
R522	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R523	1-216-059-00	METAL CHIP	2.7K	5% 1/10W	
R524	1-216-089-00	METAL CHIP	47K	5% 1/10W	
R525	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R526	1-216-114-00	METAL GLAZE	510K	5% 1/10W	
R528	1-216-077-00	METAL CHIP	15K	5% 1/10W	
R529	1-216-686-11	METAL CHIP	30K	0.5% 1/10W	
R530	1-216-686-11	METAL CHIP	30K	0.5% 1/10W	
R531	1-216-059-00	METAL CHIP	2.7K	5% 1/10W	
R532	1-216-103-00	METAL CHIP	180K	5% 1/10W	
R533	1-216-062-00	METAL CHIP	3.6K	5% 1/10W	
R534	1-216-121-00	METAL CHIP	1M	5% 1/10W	
R536	1-216-099-00	METAL CHIP	120K	5% 1/10W	
R537	1-216-083-00	METAL CHIP	27K	5% 1/10W	
R538	1-216-094-00	METAL GLAZE	75K	5% 1/10W	

Ref. No.	Part No.	Description			Remarks
R539	1-216-094-00	METAL GLAZE	75K	5% 1/10W	
R540	1-216-086-00	METAL GLAZE	36K	5% 1/10W	
R543	1-216-302-00	METAL CHIP	2.7	5% 1/10W	
R544	1-216-226-00	METAL GLAZE	15K	5% 1/8W	
R545	1-216-113-00	METAL CHIP	470K	5% 1/10W	
R546	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R547	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R548	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R549	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R550	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R551	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R552	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R553	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R554	1-216-033-00	METAL CHIP	220	5% 1/10W	
R555	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R556	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R557	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R558	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R559	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R560	1-216-129-00	METAL CHIP	2.2M	5% 1/10W	
R561	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R562	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R563	1-216-111-00	METAL CHIP	390K	5% 1/10W	
R564	1-216-025-00	METAL CHIP	100	5% 1/10W	
R565	1-216-065-00	METAL CHIP	4.7K	5% 1/10W	
R566	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R601	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R602	1-216-089-00	METAL CHIP	47K	5% 1/10W	
R801	1-216-089-00	METAL CHIP	47K	5% 1/10W	
R802	1-216-238-00	METAL GLAZE	47K	5% 1/8W	
R806	1-216-089-00	METAL CHIP	47K	5% 1/10W	
R807	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R808	1-216-047-00	METAL CHIP	820	5% 1/10W	
R809	1-216-059-00	METAL CHIP	2.7K	5% 1/10W	
R810	1-216-070-00	METAL CHIP	7.5K	5% 1/10W	
R811	1-216-077-00	METAL CHIP	15K	5% 1/10W	
R812	1-216-077-00	METAL CHIP	15K	5% 1/10W	
R813	1-216-077-00	METAL CHIP	15K	5% 1/10W	
R818	1-216-101-00	METAL CHIP	150K	5% 1/10W	
R821	1-216-113-00	METAL CHIP	470K	5% 1/10W	

Ref. No.	Part No.	Description	Remarks
		< VARIABLE RESISTOR >	
RV301	1-238-072-31	RES, VAR, CARBON 10K/10K (VOLUME)	
RV401	1-238-599-11	RES, ADJ, CARBON 4.7K	
RV501	1-238-602-11	RES, ADJ, CARBON 47K	
RV502	1-238-602-11	RES, ADJ, CARBON 47K	
RV503	1-238-601-11	RES, ADJ, CARBON 22K	
RV504	1-238-602-11	RES, ADJ, CARBON 47K	
RV505	1-238-597-11	RES, ADJ, CARBON 1K	
		< SWITCH >	
S402	1-571-506-41	SWITCH, SLIDE (BASS BOOST)	
S801	1-571-276-21	SWITCH, LEAF (OPEN SW)	
S802	1-571-506-41	SWITCH, SLIDE (HOLD/RESUME)	
S803	1-572-198-11	SWITCH, KEYBOARD (PLAY MODE)	
S804	1-572-198-11	SWITCH, KEYBOARD (▶II)	
S805	1-572-198-11	SWITCH, KEYBOARD (STOP)	
S806	1-572-198-11	SWITCH, KEYBOARD (⏮)	
S807	1-572-198-11	SWITCH, KEYBOARD (⏭)	
S808	1-572-198-11	SWITCH, KEYBOARD (REPEAT/ENTER)	
		< CRYSTAL >	
X301	1-567-908-11	VIBRATOR, CRYSTAL 16.9344MHz	
X801	1-578-773-11	VIBRATOR, CERAMIC 3.58MHz	
		**********	
		MISCELLANEOUS	
		**********	
104	⚠8-848-142-11	DEVICE, OPTICAL KSS-220A	
S901	1-570-112-11	SWITCH, LEAF (LIMIT)	
		**********	
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-465-609-11	ADAPTOR, AC (AC-96NA) (US)	
	1-465-665-11	ADAPTOR, AC (AC-96N(AU)) (Australian)	
	1-465-667-11	ADAPTOR, AC (AC-96N(CA)) (Canadian)	
	1-465-669-11	ADAPTOR, AC (AC-96N) (E)	
	1-465-817-21	ADAPTOR, AC (AC-96NES) (AEP)	
	1-555-658-21	CORD, CONNECTION	
	1-569-007-11	ADAPTER, CONVERSION 2P (E)	
	1-575-145-11	CORD, CONNECTION	
	1-590-038-11	CORD, CONNECTION	
	3-701-618-00	BAG, POLYETHYLENE	

Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Note:
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remarks
	3-752-086-01	INSTRUCTION	
	3-753-647-11	MANUAL, INSTRUCTION (ENGLISH, FRENCH, SPANISH) (Canadian, AEP, E)	
	3-753-647-21	MANUAL, INSTRUCTION (ENGLISH) (US, Australian)	
	3-753-647-41	MANUAL, INSTRUCTION (DUTCH, SWEDISH, PORTUGUESE) (AEP)	
	3-753-647-51	MANUAL, INSTRUCTION (GERMAN, ITALIAN) (AEP)	
*	4-926-687-01	CUSHION (UPPER)	
*	4-945-319-01	INDIVIDUAL CARTON (US, Canadian, E)	
*	4-945-322-01	INDIVIDUAL CARTON (AEP, Australian)	
*	4-945-326-01	CUSHION (LOWER) (US, Canadian, E)	
*	4-945-327-01	CUSHION (LOWER) (AEP, Australian)	
	8-953-307-90	HEADPHONE MDR-A10D SET (US, AEP)	
	8-953-400-90	HEADPHONE MDR-E552//K SET (Canadian, E, Australian)	

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HARDWARE LIST

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#1	7-685-102-19	SCREW +P 2X4 NON-SLIT TYPE 2
#2	7-685-103-19	SCREW +P 2X5 NON-SLIT TYPE 2
#3	7-627-552-78	SCREW, PRECISION +P 1.7X3.5
#4	7-627-552-88	SCREW, PRECISION +P 1.7X2.2

9-956-501-11

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